DEFENSE INDUSTRY BULLETIN

Volume 2 No 4
April 1966

D1.3/2:2/4

DOCUMENTS DEPARTMENT
UNIVERSITY OF FLORIDA LIBRARIES
GAINESVILLE, FLORIDA

UNIVERSITY OF FLORIDA LIBRARIES
MAY 1966

DEPARTMENT OF DEFENSE

UNIV. OF FLORIDA LIBS.
DOCUMENTS
DEPARTMENT
U.S. DEPOSITORY

Publication of
ASSISTANT SECRETARY OF DEFENSE-PUBLIC AFFAIRS

IN THIS ISSUE

Defense Industry Advisory Council 1
The Phoenix Missile System: Preparing for Tomorrow, Today 3
An Analysis of Cost Information Reports 5
The Army's Senior Scientific Advisors 7
Two Step Formal Advertising: A Case History 8
Navy Reorganizes Material Command Structure 12
Trends in Air Force Research and Development 14

DEPARTMENTS

About People 10
Bibliography 11
Speakers Calendar 17
From the Speakers Rostrum 18
Meetings and Symposia 22
Calendar of Events 23
Notes for Editors 24
Defense Procurement 25

DIAC Fills Important Advisory Role to DOD

Cyrus R. Vance
Deputy Secretary of Defense

Next month the Defense Industry Advisory Council will be four years old. The council was established to provide a forum in which Department of Defense logistics policies and practices can be discussed at top management levels. This objective is being met to the benefit of both the Government and industry.

With the continued support of public spirited executives, willing to serve on the council and its working groups, the DIAC can go on filling an important advisory role in the years ahead.

Cyrus R. Vance

(See related article on page 1.)

Industry Urged To Step Up Participation in Savings Bonds Program

Following is a letter from Secretary of Defense Robert S. McNamara addressed to the defense industry community encouraging increased support of the U.S. Savings Bonds program:

Dear Defense Contractor:

As you know, the President is most anxious to increase participation in the U.S. Savings Bonds program and to this end has raised the interest rate from 3.75 to 4.15 percent. In furtherance of this objective, I have launched an intensive campaign throughout the Department of Defense.

There are many compelling reasons for all Americans to support their Government in meeting the urgent needs of the times. Particularly, we must back up our men both on the fighting fronts of Vietnam and in their defense of freedom in many other parts of the world.

I am aware of the many outstanding efforts on the part of defense contractors in promoting participation through the Payroll Savings Plan. Therefore, I am confident that the men and women of your organization, as well as of your subcontractors, will be glad to redouble their efforts. This is the opportune moment for your executives and employees to increase their bond allotments, and for those who have not already done so, to join the Payroll Plan. The increase in the interest rate has made savings bonds a most attractive and effective means for all Americans to accumulate savings with absolute safety.

I ask your full support in promoting this campaign.

Sincerely,

Robt S. McNamara

"Doing Business With AVCOM" Pamphlet Available

With Army requirements for aircraft and support equipment reaching a new peak, due largely to military operations in Vietnam, the Army Aviation Materiel Command (AVCOM) presents a broad range of contract opportunities for both large and small industries.

This fact is brought out in a newly revised edition of a brochure titled "Doing Business with AVCOM," which has been issued to facilitate contracting with interested business concerns.

Brigadier General Howard F. Schiltz, AVCOM commanding general, in a foreword to the publication, states that the Army Aviation Materiel Command is depending in increasing measure upon qualified small business concerns for numerous items of aircraft replenishment spare parts and aerial delivery material.

The Aviation Materiel Command, with headquarters located in the Mart Building, 12th Blvd. and Spruce St., St. Louis, Mo., exercises world-wide responsibility for procurement and support of Army aeronautical equipment.

Copies of the publication may be obtained without charge from the Information Office, AVCOM, P.O. Box 209, Main Office, St. Louis, Mo. 63166.

DEFENSE INDUSTRY

BULLETIN

Published by the Department of Defense

Hon. Robert S. McNamara
Secretary of Defense
Hon. Cyrus R. Vance
Deputy Secretary of Defense
Hon. Arthur Sylvester
Assistant Secretary of Defense (Public Affairs)
Col. J. B. Cross, USAF
Director for Community Relations
Col. Edwin C. Gibson, USA
Chief, Business & Labor Division

Editor........LCdr. E. W. Bradford, USN
Assoc. Editor..........Miss Cecilia Pollok
Assoc. Editor............Mr. Rick La Falce
Editorial Assistant
Norman E. Worra, JO1, USN

The *Defense Industry Bulletin* is published monthly by the Business & Labor Division, Directorate for Community Relations, Office of the Assistant Secretary of Defense (Public Affairs). Use of funds for printing this publication was approved by the Director of the Bureau of the Budget.

The purpose of the *Bulletin* is to serve as a means of communication between the Department of Defense (DOD) and its authorized agencies and defense contractors and other business interests. It will serve as a guide to industry concerning official policies, programs and projects, and will seek to stimulate thought by members of the defense-industry team in solving the problems that may arise in fulfilling the requirements of the DOD.

Material in the *Bulletin* is selected to supply pertinent unclassified data of interest to the business community. Suggestions from industry representatives for topics to be covered in future issues should be forwarded to the Business & Labor Division.

The *Bulletin* is distributed without charge each month to representatives of industry and to agencies of the Department of Defense, Army, Navy and Air Force. Requests for copies should be addressed to the Business & Labor Division, OASD(PA), Room 2E813, The Pentagon, Washington, D.C. 20301, telephone, OXford 5-2709.

Contents of the magazine may be reprinted freely without requesting permission. Mention of the source will be appreciated.

Defense Industry Advisory Council

by
Clyde Bothmer

The Defense Industry Advisory Council (DIAC) met on February 18 and 19 for the twelfth time since it was established by DOD Directive 5030.22, dated May 23, 1962.

It seems an appropriate time to take a brief look at the council's organization, membership and activities since the February meeting was the first for six new members as well as for its second Executive Secretary.

The six new members of the council are:

Fred Borch, President and Chief Executive Officer, General Electric Co.
Kermit Gordon, Vice President, The Brookings Institution.
Daniel Haughton, President, Lockheed Aircraft Corp.
Donald Holden, Chairman and President, Newport News Shipbuilding and Dry Dock Co.
Roger Lewis, Chairman and President, General Dynamics Corp.
Noel B. McLean, Chairman, Edo Corp.

The writer succeeded the first DIAC Executive Secretary, Samuel Crosby, in the fall of 1965 and, as previously noted, the February meeting was his first in this capacity.

Deputy Secretary of Defense Cyrus Vance is the Chairman of the Defense Industry Advisory Council. The Alternate Chairman is Assistant Secretary of Defense (Installations and Logistics) Paul Ignatius, and Dr. Ruben Mettler, President, TRW Systems, is Industry Vice Chairman.

Other industry members, in addition to the new members already listed, are:

William Allen, President, The Boeing Co.
George Brown, Chairman, Brown and Root, Inc.
Carter Burgess, Chairman, American Machine and Foundry Co.
Malcolm Ferguson, Chairman, Finance Committee, The Bendix Corp.
Paul Gorman, President, Western Electric Co.
E. V. Huggins, Consultant.
Thomas Jones, Chairman, President and Chief Executive Officer, Northrop Corp.
C. H. Kellstadt, Chairman, Board of Trustees, Logistics Management Institute.
J. R. Kerr, President, Avco Corp.
Jervis Langdon, Chairman and President, Chicago, Rock Island and Pacific Railroad.
John Lawrence, Chairman and President, Dresser Industries.
Thomas Nichols, Chairman, Executive Committee, Olin Mathieson Chemical Corp.
Dr. Emanuel Piore, Vice President, IBM Corp.
C. B. Thornton, Chairman and Chief Executive Officer, Litton Industries.
Paul Wishart, Chairman, Finance Committee, Honeywell, Inc.

Council members are carefully selected for their ability to provide expert advice on a number of diverse subject areas and, hence, are chosen from a wide cross section of the private sector of the U. S. economy. Rotation of members—approximately one-third every two years — helps further to broaden this experience base.

A word on the purposes of the council is probably useful since its role in advising the Department of Defense on logistics policy matters is not widely known. DOD Directive 5030.22 states that the mission of the council is to provide:

- The Secretary of Defense and his principal management assistants a forum for the presentation of logistics management objectives, problems and accomplishments to a representative cross section of defense industry.
- Representatives of defense industry a forum for discussing directly with the principal executives of the Department of Defense their suggestions and constructive criticisms of logistics management policies and practices from the viewpoint of their effect on defense industry.
- A focal point for the review and discussion of the findings of industry study groups which should be brought to the attention of the Secretary of Defense.

Mr. Clyde Bothmer is Executive Secretary of the Defense Industry Advisory Council. Prior to this appointment, he was Director of Management for Manned Space Flight, National Aeronautics and Space Administration. He holds a B. A. degree in Political Science from the University of Iowa and a J. D. degree from that university's law school.

The council is organized and functions in accordance with Executive Order 11007 governing the formation and use of advisory committees. It has met an average of three times each year—generally in the spring, fall and winter.

The first meeting of the council was devoted primarily to a discussion of organization and working procedures and the subject areas in which the council might be of most benefit. Subsequent meetings have been concerned with many aspects of Government-industry relationships. As a result, workable answers for a number of the problem areas have been found, and solutions for others are being sought.

A frequently asked question is how the council actually identifies issues with which it should be concerned, and how it conducts its work concerning those issues.

Topics or issues proposed for discussion with the council by the DOD are usually based on staff studies made within the Department. Council members may propose and present industry views based on studies by individuals, industrial associations, companies, or other groups although, in deliberations on all issues, it is understood that council members represent no one but themselves. Once an issue is fully identified, experts from the Department and industry are usually brought together in a supporting group to advise on a solution. These supporting groups are organized as subcommittees (involving members of the council) or study or working groups (normally with direct participation by council members). Except for certain supporting groups with long range advisory assignments, the groups go out of existence once the assigned task has been completed. In order to provide for a good working arrangement, the number of persons appointed to each of these supporting groups is relatively small.

Perhaps the best way to put into focus the scope of the council's activities is through an identification of a few of the existing working groups and subcommittees concentrating on current policy matters. These include working groups on the Contractor Performance Evaluation (CPE) program and the Contractor's Weighted Average Share in Risk (CWAS) program, as well as subcommittees on Contractors' Independent Technical Effort (CITE) and Effect of Defense Procurement Policies on Profits. There are 14 other supporting groups of DIAC now active and one currently being formed to advise on matters incident to the Total Package Procurement Concept.[1]

Throughout its wide scope of interests, the council's activities are closely coordinated with those of industry associations also supplying advice and assistance to the Defense Department. Normally, a DIAC subgroup with its DOD chairman supplies advice in an area for which the chairman is responsible within the Department. As policy papers approach a cohesive state they may be submitted to industry, generally through an appropriate industry association. When the industry comments have been received, the DIAC subgroup may again provide advice as proposed DOD policy statements near final form. Industry associations also assist by nominating members to serve on DIAC supporting groups. Currently, the Council of Defense and Space Industry Associations (CODSIA) has been asked to nominate a slate of candidates from which the working group for the Total Package Concept can be chosen.

---

[1] *"Total Package Concept," by Maj. Gen. Charles H. Terhune, Jr., USAF,* Defense Industry Bulletin, *Feb. 1966.*

The creation of this latest working group not only serves as an indication of the way in which the efforts of DIAC and the major industry associations complement each other, but also provides a convenient bridge in this article to cross from a general discussion of DIAC and its work to a more specific look at several current matters under consideration by the council. The agenda for the February meeting included among other topics, presentations (and extensive discussions) on the total package concept and the current DOD interest in the levels of profits being realized on defense contracts. Since these are both important and timely subjects, a brief discussion of each, in the context of the DIAC's activities, might be worthwhile.

Three presentations were made to the council on the subject of total package. Assistant Secretary of the Air Force Robert Charles discussed the concept generally; Assistant Secretary of the Navy Graeme Bannerman spoke of its applicability in the Navy, specifically in light of the Fast Deployment Logistics Ship program[2]; and Lockheed's President, Daniel Haughton, took a look at it from the standpoint of an interested contractor. Because of the considerable detail that has already been published on total package, it will not be discussed in this article further except to mention three recommendations which were made and accepted as a part of the council's February discussion:

- The Defense Department agreed to take another close look at the whole subject of team bids, and the difficulties incident to holding teams together during the various phases of a total package procurement including the technical transfusion process.
- The council recommended that the Defense Department look into the adequacy of existing price indexes available for use in the negotiation of escalation clauses in the long term contracts.
- A DIAC working group will be created to advise the Defense Department on its formulation of total package policy guidance and application criteria.

The second subject taken from the February DIAC agenda to illustrate the council's methods of operation involves the impact of Defense procurement policies on the profits being earned by defense contractors.

The Armed Services Procurement Regulation (ASPR) provides that:

> **It is the policy of the DOD to utilize profit to stimulate efficient contract performance. Profit generally is the basic motive of business enterprise. The Government and defense contractors should be concerned with harnessing this motive to work for more effective and economical contract performance. Negotiation of very low profits, the use of historical averages, or the automatic application of a predetermined percentage to the total estimated cost of a product, does not provide the motivation to accomplish such performance. Furthermore, low average profit rates on defense contracts overall are detrimental to the public interest. Effective national defense in a free enterprise economy requires that the best industrial capabilities be attracted to defense contracts. These capabilities will be driven away from the defense market if defense contracts are characterized by low profit opportunities. Consequently, negotiations aimed merely at reducing profits, with no realization of the function of profit cannot be condoned. For each contract in which profit is negotiated as a separate element of the contract price, the aim of negotiation should be to employ the profit motive so as to impel effective contract performance by which overall costs are economically controlled. To this end, the profit objective must be fitted to the circumstances of the particular procurement, giving due weight to each of the performance, risk, and other factors set forth in this 3–808. This will result in a wider range of profits which, in many cases, will be significantly higher than previous norms.**

For several years the Defense Department has been developing and refining methods through which data can be gathered on defense profits, in order to know whether this policy is being met. Unfortunately, information drawn solely from internal records is not adequate in many respects; it does not provide a basis for comparison with non-Defense profits; it is frequently available only after the elapse of considerable time; and it is incomplete—particularly in price competitive areas. Hence, data must also be obtained through voluntary submissions from defense contractors.

A DIAC subcommittee was formed last December to advise on the development of a plan by which the required information might be obtained and safeguarded. This plan has reached the stage where, following aproval from the Bureau of the Budget, a number of companies will be asked to supply data, on a continuing, but infrequent, basis. The plan envisions that the data from those companies which agree to participate will be consolidated. In no case, even in the data submitted by an individual company prior to its consolidation with that from the other participants, will profits on individual contracts be needed. In every case, data obtained will be closely held.

Through study of the data being obtained from a small number of companies on a voluntary basis, senior officials of the Department will be in a better position to determine the effect of profit policies and to ascertain the need for any changes.

Early in June the DIAC will meet again to continue its little publicized, but highly effective, advisory role.

Security Classification Guidelines Published for DOD Construction Projects

Security classification guidelines for Department of Defense construction projects have been outlined in a DOD instruction published Jan. 13, 1966.

Titled "Security Classification Guides for DOD Construction Projects," (DOD Instruction 5210.49), the guidelines provide, as a matter of policy, for publication of as much information pertaining to Defense construction activities as can be released without revealing classified information.

It expresses the concept that techniques and materials used in defense construction projects ordinarily are common to the construction trade and universally applied and, therefore, do not require security classification. However, it identifies those kinds of construction details which do require classification.

An important aspect of the instruction is to provide the specific guidance needed for identifying those particular aspects and details of construction which might serve the purposes of would-be saboteurs or espionage agents.

A basis is given in the instruction for identifying sensitive information and for understanding how that information can be revealed in relationship to the various phases of construction or in the contents of contracts, specifications, blueprints, or other documents containing construction data. The relation of security costs to security classification is discussed and a procedure provided to resolve problems of that nature. A guidance resumé is included to provide a convenient means for interrelating and coordinating the security aspects of defense construction activities with established classification principles.

---

[2] *"The FDL Ship Project," by RAdm. Nathan Sonenshein, USN,* Defense Industry Bulletin, *Feb. 1966.*

The Phoenix Missile System: Preparing for Tomorrow, Today

by

Captain K. C. Childers, Jr. USN
Dep. Project Manager for Phoenix
F–111B/Phoenix Weapon System Project
Office of Chief of Naval Material

The air war being waged from Point Yankee and Point Dixie in the South China Sea has fully vindicated the Navy's furtherance, during the Cold War years, of the art and science of carrier warfare. Vietnam and the numerous other confrontations of recent years have served to underscore dramatically the fact that carrier-based aviation is firmly established as one of our country's principal means of flexible response. The current Federal budget submission, which contains requests for the personnel and "things" needed to expand this capability, stands as a carefully deliberated testimonial to the reliance that the Department of Defense places on naval aviation. These budget requests range from a new nuclear-powered carrier, plus both replacement and new model aircraft, down to the wide diversity of support equipment and the nuts and bolts needed to keep our carrier striking forces in top condition.

As an important ingredient in the credibility (and, frequently, the actuality) of the United States' military strength, each aircraft carrier represents an expensive, 20-years-plus capital investment. As one step toward the maximum return on this investment during the decade of the 1970's, the Navy in 1962 commenced development of the Phoenix missile system—a revolutionary concept that represents a significant technological advance in aerial warfare. The Phoenix development is a striking example of one of the ways the Navy is preparing for tomorrow's conflict today.

As an aggressive inroad into the realm of airborne intercept (AI) techniques, Phoenix stands in contrast to more conservative approaches that strive for only incremental improvements in the performance of existing systems. Although this latter course of action is a tempting alternative in the current limited war environment of relatively unsophisticated opposition, it does not provide for the enemy of the future who quite possibly may be both determined and sophisticated. With the Phoenix system we will have the capability to detect and track multiple air targets at extremely long ranges and then attack and kill at long range and on a priority, or degree of threat, basis—all in coordination with the Naval Tactical Data System (NTDS), the Airborne Tactical Data System (ATDS), and ship and shore based defenses. A capability of this magnitude will give our carrier forces in the 1970's the ability to project dominant air superiority over distant ocean and amphibious objective areas and, perhaps more importantly, insure through the long range of Phoenix missiles that our interceptors are not out-ranged by enemy missiles. Mere knowledge of the presence of Phoenix should serve to deter.

As a weapon system concept Phoenix literally rose from the ashes of Navy aspirations in the late 1950's to combine the punch of a long range, sophisticated air-to-air missile with a subsonic aircraft launch platform, in an effort to extend the radius of protection derived from air-to-air weapons as far as practicable from task force centers. These aspirations took form as the Eagle/Missileer concept which postulated a subsonic launching platform in order to give the system the on-station (or loiter) time necessary for maximum effectiveness. Marrying the Phoenix system to a subsonic jet, such as the present Navy A-6 Intruder, would begin to approximate the old Eagle/Missileer concept. However, in recent years, the variable sweep wing of the aeronautically-daring F-111 has become a reality; thus, Phoenix is now under development as the armament system for the Navy's version of the F–111, the F–111B. The F–111B provides an aircraft platform with an Eagle/Missileer type of loiter capability plus the added capability of sustained supersonic flight.

Capt. K. C. Childers, Jr., USN, is Dep. Project Manager for the Phoenix weapon system in the Office of Naval Material. He began his naval career as a carrier fighter pilot and has held several important assignments in the field of missile development. He was awarded the Legion of Merit for his work on Polaris and was Commander of the Naval Missile Center.

The two basic elements of the Phoenix missile system are the AWG–9 Airborne Missile Control System (AMCS) and the AIM–54A missile. The AMCS consists of a pulse doppler radar as its primary target sensor, a parallel infrared (IR) target sensor, a multi-purpose digital computer, and associated control and display subsystems. The pulse doppler radar system represents the culmination of years of development in transmitter tubes, crystal filters and planar array antenna techniques—all essential improvements in AI radar state of the art before the long range requirements of Phoenix could be met. A low noise parametric amplifier in the receiver section contributes to this long range capability. Advanced doppler techniques make look-down target acquisition possible. A flexible, high capacity computer permits simultaneous track of a large number of targets and aids the missile control officer (MCO) in the assignment of kill priorities and in missile firing. Six AIM–54A missiles are available for quick reaction launch.

The IR target detector system in Phoenix complements the AI radar's operation. In conjunction with the radar, and slaved to it, the IR subsystem has the angular resolution to count the individual elements of a raid that to the radar might appear as a single blip. Alternately, the IR subsystem can contribute high-altitude surveillance when the radar is occupied with attacks at low level. The sensor is especially effective against small, high-speed targets that present a very small cross section to the radar.

Data processing in the AWG–9 AMCS is performed in a general purpose digital computer that features high speed operation and a large memory capacity in an extremely compact package. The computer keeps track of targets detected by the radar while the radar continues to search. Based on pre-programmed logic the computer evaluates threats, generates steering information for the pilot, and paints a complete tactical situation for the MCO by designating friendly and hostile targets in standard NTDS symbology, all based on data generated either internally by Phoenix or obtained through external data links.

Another important function of the Phoenix computer system is for it to run a continuous confidence check on critical system parameters and to indicate tactics to be applied in degraded modes of operation. As a maintenance tool, the computer conducts self-test and fault-isolation routines on the whole Phoenix system in order to isolate faults to a specific, replaceable unit. This would be done when the F–111B is returning from a mission and is the key to the expected short turn-around time expected of the F–111B/Phoenix system on carrier decks. The Phoenix computer also can direct, as alternate modes, execution of any secondary missions assigned to the F–111B, such as, conventional ordnance delivery.

The Bureau of Naval Weapons is developing the Phoenix missile system through the combination of a coordinated program within its major field activities (see accompanying list) and a cost-plus-incentive-fee contract with the Hughes Aircraft Co. of Culver City, Calif. In general, the Bureau of Naval Weapons' field activities are responsible for ordnance component development and continuing test and evaluation responsibilities. Additional support is being rendered by other activities of the Naval Materiel Support Establishment. Hughes has prime contractor cognizance over total system development, which includes fabrication of the AIM–54A missile and the AMCS. The Rocketdyne Division of North American Aviation, Inc., is principal subcontractor for the solid propellant motor; UNIVAC and Control Data Corporation have competing designs for the central data processor. Several dozen other subcontractors of varying specialties contribute to the total Hughes effort. The Phoenix system benefits directly from the Hughes/Air Force-sponsored ASG–18/GAR–9 air defense missile system development.

Overall Navy control of the Phoenix development is proceeding under the relatively recent innovation of intensified project management emanating from an Office of Naval Material Project Management Office. In this case, it is the F–111B/Phoenix Weapon System Project with Rear Admiral W. E. Sweeney, USN, the designated project manager. Phoenix equipment will be furnished as Government Furnished Aviation Equipment to the F–111B aircraft, which is being developed by the General Dynamics Corp. under the direction of the Air Force Program Director, F–111 Systems Program Office (SPO), Major General J. L. Zoeckler, USAF. Admiral Sweeney serves as General Zoeckler's deputy for SPO operations at Wright-Patterson AFB, Ohio, in addition to his duties as a Navy project manager.

As a high priority, many-faceted project, the development of Phoenix reaches deep into the technology and strengths of a balanced industry/Navy team. Through the collective efforts and perseverance of hundreds of people in these organizations, the Phoenix missile system will meet its commitment to the Fleet.

U. S. Navy F–111B in flight armed with Phoenix missiles.

Participating Bureau of Naval Weapons Field Activities in Phoenix Missile System Development

Naval Air Development Center,
Johnsville, Pa.

- Renders technical advisory services to the project office and is responsible for developing handling equipment.

Naval Missile Center,
Point Mugu, Calif.

- Coordinates range support at the Pacific Missile Range and provides targets for contractor tests. Will conduct the Navy technical evaluation (NTE) of the system.

Naval Air Test Center,
Patuxent River, Md.

- Coordinates Navy test efforts and will conduct tests that evaluate the AMCS.

Naval Weapons Laboratory,
Dahlgren, Va.

- Responsible for safety studies and is developing the high explosive warhead and cartridges for the ejection launchers.

Naval Ordnance Laboratory,
Corona, Calif.

- Responsible for developing the missile target detection device, the safe/arm device, tactical telemetry receiver and recorder.

Naval Ordnance Laboratory,
White Oak, Md.

- Responsible for developing special ordnance eqipment.

Naval Air Engineering Center,
Philadelphia, Pa.

- Determines ship compatibility requirements.

Naval Ordnance Test Station,
China Lake, Calif.

- Conducts rocket motor sled tests and assists in defining bombing computer requirements.

Naval Ordnance Plant,
Louisville, Ky.

- Is developing missile packaging.

Naval Propellant Plant,
Indian Head, Md.

- Performs rocket motor propellant characterization tests.

An Analysis of Cost Information Reports

by
Chauncey H. Dean
Professor of Cost and Economic Analysis
Air Force Institute of Technology
Wright-Patterson AFB, Ohio

Students at the Air Force Institute of Technology have frequently asked about Cost Information Reports (CIR), the relationship of CIR to the Cost and Economic Information System (CEIS) and, in a broader sense, the need for DOD-wide integrated external information systems. These questions provided the motivation for this article, which is intended to focus attention on CIR.

There are five different reporting formats comprising CIR. Defense contractors would be responsible for preparing and submitting one or more of the reports in response to a contractual requirement. The managerial cost information to be presented in the reports would pertain primarily to contractual items procured by the Defense Department from defense contractors. These reports, then, could be classified as being a part of the external reporting system, as differentiated from the internal reporting systems within DOD.

While CIR is still in the talking phase, it appears to be in the final stages of discussion within DOD. To understand more fully why the Cost Information Reports will soon become a reporting requirement, it is helpful to analyze some of the significant events leading to CIR.

Events Leading to CIR.

Is CIR just another additional reporting requirement to be placed on defense contractors? What is being done by DOD to coordinate and control the quantity and type of information to be reported by defense contractors on contracts? To answer these questions and others, let's first examine the overall changes in the defense industry product and price environment and analyze their impact on management information requirements within DOD.

Much has been written about the significant changes during the past 25 years in the defense industry product environment. The advent of jet propulsion, electronic systems, ballistic missiles, satellites, space probes and spacecraft, all since the A-bomb was dropped on Hiroshima on Aug. 6, 1945, has focused attention on the dynamic technology in weaponry.

During this same period, the changes in the defense industry price environment have been revolutionary rather than evolutionary. From the high production volume, low unit cost structure experienced during World War II, the pricing environment in the 60's has changed to a low production volume, high unit cost structure. While the A-bomb was the first billion-dollar weapon, it is now common for a new major weapon or support system (when the expenditures for research, development, test and evaluation, acquisition of equipment and operations are all considered) to be in the multi-billion dollar class. The magnitude and trend of defense expenditures for research, development, test and evaluation, facilities and acquisition of capital equipment are displayed in Table 1.

The unparalleled changes in the defense industry product and price environment, the significant increases in the number of variables and alternatives to be considered in military decision making and the high level of defense expenditures — all happening within a comparative short time—sparked a tremendous increase in demand from DOD and defense industry management for both technical and financial information. Some have called it an information explosion.

It is generally understood that the management information explosion within the DOD and defense industry has not always been orderly and coordinated in such a way as to prevent serious duplications and omissions. Types of information needed for decision-making purposes have not always been collected in the right format and stored in data libraries. Also, information storage and retrieval systems have not always been responsive to management needs.

The expanded need for cost and related information pertaining to weapon systems and major items of equipment—all designed to aid decision makers in making complex capital acquisition decisions—resulted in each of the Military Services and Defense agencies establishing a wide range of different reporting requirements for defense contractors. Presumably, each new reporting requirement was established in response to the needs of particular management groups. However, understanding and using the data provided from the different information systems has become somewhat comparable to understanding and using several foreign languages. Moreover, defense contractors have had a very difficult task complying with the diffused reporting requirements. Consequently, it is difficult for defense industry management to train personnel and maintain accuracy in estimating and reporting.

Relationship of CIR to CEIS.

The aforementioned developments produced a need for analyzing the many existing external information systems and establishing DOD-wide integrated information systems. The long-range objective would be management information systems which are integrated through common language and which serve the needs of different levels of DOD and defense industry management. An important step in this direction occurred on July 7, 1964, when a DOD directive pertaining to CEIS, numbered 7041.1, was

Expenditures for Research, Development, Test & Evaluation, Military Construction and Procurement for Fiscal Years 1955–1964

(Millions of Dollars)

Fiscal Year	Research, Development, Test & Evaluation	Military Construction	Procurement	Total
'55	2,267	$1,715	$12,838	$16,820
'56	2,101	2,079	12,227	16,407
'57	2,406	1,968	13,488	17,862
'58	2,504	1,753	14,083	18,340
'59	2,866	1,948	14,409	19,223
'60	4,710	1,626	13,334	19,670
'61	6,131	1,605	13,095	20,831
'62	6,230	1,346	14,623	22,199
'63	6,375	1,143	16,659	24,177
'64	7,018	1,022	15,349	23,389

Table 1.

issued. This directive explained the following aspects of the Cost and Economic Information System:

- Purpose and objective.
- Applicability.
- Scope.
- Responsibilities and functions.
- Implementation and effective date.

Following the directive, Secretary McNamara issued a memorandum for the Secretaries of the Army, Navy and Air Force and the Directors of the Defense Supply Agency and Defense Contract Audit Agency transmitting draft discussion copies of CEIS reporting requirements.

While CEIS is currently in the process of being replaced by another system, it is important from a historical viewpoint to understand the relationship of CIR to CEIS. CEIS was much broader in concept than CIR. Under CEIS, the responsibility was placed on the Services to establish the necessary internal cost analysis organizations for implementing the external reporting system and analyzing, storing, retrieving and processing the data received. CEIS reports included the five reporting formats comprising CIR and, in addition, a Financial Management Report and Economic Impact Report.

CIR, then, represents some of the requirements of CEIS. The remainder of this article will pertain to the Cost Information Reports.

An Overview of CIR.

The Cost Information Reports are designed to collect cost and related data on hardware, software, or services pertaining to major items of military equipment. Initially, data will be reported only on aircraft, missiles, space systems and related components.

These reports are designed to satisfy only a very small part of the requirements of a project manager. They do, however, require uniform formats, work breakdown structures, functional cost categories and functional cost elements so that the informational language of the reports and the resulting data can be understood and used by people in different management functions.

Information to be provided in the Cost Information Reports takes into consideration needs and responsibilities throughout DOD; for example, some of the areas using such data would be systems analysis, cost estimating, programming, budgeting and procurement. Such information should also be important to defense contractors in:

- Estimating costs of major items of equipment and related components.
- Preparing contract proposals.
- Reporting on the progress of contracts.
- Internal planning, programming and budgeting.

Moreover, the defense industry should benefit from the DOD-wide uniform reporting formats and the resulting elimination of duplicated and overlapping requirements for information.

Defense contractors will be particularly concerned with the cost reporting forms. The forms to be submitted, the frequency with which each form is prepared and the data required on each form will be identified first in a Cost Data Plan (CDP). The CDP is an internal DOD report and is the vehicle by which the Military Departments specify their cost data requirements for aircraft, missile and space programs. After approval by the Office of the Secretary of Defense, information from the CDP will be extracted and incorporated in requests for proposal and in contracts by contracting officers.

Five cost report forms are to be prepared and submitted by defense contractors:

- Contract Cost Data Summary.
- Functional Cost Hour Report.
- Progress Curve Report.
- Fiscal Year Data Summary.
- Fiscal Year Functional Cost-Hour Report.

The CIR Structure.

An objective of CIR is cost reporting in a consistent manner among contractors. To achieve consistence, the reporting language must be clearly defined. Such terms as work breakdown structure, work breakdown structure elements, functional categories, functional elements, cost incurred, recurring and non-recurring cost have specialized meanings.

To describe some of the peculiar terms very briefly, the reporting framework is the work breakdown structure. (WBS). Elements of the WBS are the end items of hardware, software, or services for the major DOD-procured items within system families, i.e., aircraft, missiles, etc. For example, a partial listing of the WBS elements for an aircraft system might be as follows:

Air Vehicle

Airframe
Automatic Flight Control
Armament
Other

Tests, Test Spares, Mock-ups

Fatigue Articles and Test
Flight Tests

System Engineering

Training

Services
Equipment

Data

Functional cost category descriptions include:

- Engineering.
- Tooling.
- Quality Control.
- Manufacturing.
- Purchased Equipment.
- Material Overhead.
- Subcontract (Non-Airframe).
- Other Items Not Shown Elsewhere.
- Total Cost (Less General and Administrative).
- General and Administrative.
- Fee or Profit.
- Total.

The functional elements are:

- Direct Labor Hours.
- Direct Labor Dollars.
- Overhead.
- Material and Purchased Parts.
- Other Direct Charges.
- Total.

The reporting forms, peculiar terms and instructions pertaining to the cost reports are explained in much greater detail and depth in a new coordination draft manual titled, "Cost Information Reports (CIR): Aircraft, Missile and Space Systems," dated Dec. 1, 1965, and issued by the Office of the Assistant Secretary of Defense (Comptroller). However, the foregoing summary description of the peculiar terms should provide a foundation for a highly condensed version of the five forms to be submitted by contractors.

The Contract Cost Data Summary is a summary report that covers all activities included in a contract or proposal. This report summarizes the costs by WBS element. The Functional Cost Hour Report and Progress Curve Report would be prepared for designated WBS elements specified in the contract. The Functional Cost Hour Report and Progress Curve Report present supplementary cost and related data by functional categories and functional elements for each of the larger specifically designated WBS elements. Thus, the contract Cost Data Summary portrays complete costs and prices, while the Functional Cost Hour Report and Progress Curve Report provide supplementary information on a few designated WBS elements.

The Fiscal Year Data Summary Report and the Fiscal Year Functional Cost Hour Report are designed specifically for use in major weapon/support system programs. The Fiscal Year Data Summary Report presents program estimates summarized by fiscal year for each of the relevant WBS elements. The Fiscal Year Functional Cost Hour Report presents additional cost information by fiscal year and by functional categories and elements for selected WBS elements.

Current Developments.

Since the Cost Information Reports are highly aggregative in nature, it is anticipated that more detailed information such as PERT/Cost will still be required for system/project management control needs. In this respect, the new Assistant Secretary of Defense (Comptroller), Robert Anthony, is emphasizing an integrated DOD-wide external information system concept much broader in scope than CEIS. This renewal effort will seek to establish a Selected Acquisition Information and Management System (SAIMS). An analysis of SAIMS, which will supersede CEIS, is beyond the scope of this article and will be the subject of another article soon to be published in the *Defense Industry Bulletin.*

The Army's Senior Scientific Advisors

The Army Scientific Advisory Panel (ASAP) includes some of the nation's most distinguished civilian scientists, educators, industrialists, and engineers. These men are the senior scientific advisors to the Secretary of the Army. They provide counsel on R&D matters to the Chief of Staff, the Assistant Secretary of the Army (R&D) and the Chief of Research and Development. The panel maintains a small core (at present, 21 out of 25 authorized) of active members and a variable larger group of consultants (approximately 40). Both members and consultants are appointed for a two-year term. The Panel Secretariat is furnished by the Office of the Chief of Research and Development (OCRD) and is located in the Pentagon.

To keep abreast of the Army R&D program, members meet three times a year—February, June and October. Members and consultants attend an annual meeting in June. On these occasions, activities of specific military installations are viewed and briefings on areas of particular interest are received.

This panel, established in November 1951 by the Secretary of the Army, was born in an atmosphere of radically accelerated R&D activities. Instead of coping with specific laboratory solutions, its members focus efforts on challenging the laboratory leaders to accelerate progress in new areas. It is hoped that this concept, as it appears to the Army R&D Program, can be directed toward both tactics and hardware, so that lead time can be reduced through proper training and improved development.

Although the panel's role in this partnership with the Army may not be well known, its influence is taking effect in numerous ways; a tropic test center in the Canal Zone, improvements to the White Sands Missile Range, an Officer Evaluation Center in Alabama—all result from specific recommendations by the Army's senior scientific advisors.

The ASAP comprises many talents. Currently the 21 members and 40 consultants represent 16 scientific disciplines; they are affiliated with 16 industries and with 22 colleges and universities. Industry heads, directors of research, university presidents and professors are included. This broad base of scientific and technological expertise provides both a resource of specialists and a detached outlook which the Army needs to help solve its R&D problems.

The present Chairman of the panel is Dr. Harold M. Agnew, Leader of the Weapons Division, Los Alamos Scientific Laboratory. He was a physicist with the Manhattan Project from 1942–1946 and Scientific Advisor, Supreme Allied Command, Europe, prior to assuming his present position at Los Alamos.

ASAP Vice Chairman is Dean Ralph E. Fadum, Dean of the School of Engineering, North Carolina State University at Raleigh. Dean Fadum was appointed to the panel in 1959 and assumed his present duties on January 5, 1966.

Since 1951 when it had only 10 members, the panel has undergone several reorganizations seeking to achieve responsiveness to the Army's needs. The panel was not established to act as a body or single committee. Initially, subpanels were created for the following functional areas:

Air Mobility.
CBR Warfare.
Communications & Electronics.
Ground Mobility.
Firepower.
Human Factors.
Operations Research.
Management of R&D.

Later, in the interest of flexibility, ad hoc groups replaced the permanent subpanel system. At the same time that permanent subpanels were discontinued, it was decided to bring the panel closer to similar special advisory groups which were serving the major commodity commands of the U.S. Army Materiel Command and the Scientific Advisory Group of the Combat Developments Command. This was accomplished by including on the ASAP as permanent members the chairmen of these advisory groups. Thus, seven chairmen of speciality advisory elements were added to the membership of the ASAP.

Subjects for ad hoc group study are normally suggested by the Army Materiel Command (AMC), Combat Developments Command (CDC), or one of the divisions of OCRD. The Panel Executive Committee (composed of the Assistant Secretary of the Army (R&D); the Chief of Research and Development; Panel Chairman and Vice Chairman; Commanding General, AMC; Commanding General, CDC; and ASAP Executive Secretary) selects the chairman for an approved study who, in turn, picks the members of his ad hoc group. Upon completion of the study, the final report is forwarded to the Chief of Research and Development and Assistant Secretary of the Army (R&D) for action, as appropriate, on the report's specific recommendations.

Since 1963, 11 ad hoc groups have completed work in the following areas:

White Sands Missile Range.
Chairman: Dr. Charles C. Lauritsen, Professor Emeritus, California Institute of Technology.

Mobile Energy Depot Concepts.
Chairman: Dr. Harold C. Weber, Professor Emeritus, Massachusetts Institute of Technology, and Chief Scientific Advisor, U.S. Army.

In-House Laboratories.
Chairman: Dr. Hector R. Skifter, Deceased (late President, Airborne Instruments Laboratory).

Tactical Communications.
Chairman: Mr. Donald G. Fink,

(Continued inside back cover)

Dr. Harold M. Agnew
Chairman
Army Scientific Advisory Panel

Dean Ralph E. Fadum
Vice Chairman
Army Scientific Advisory Panel

Two-Step Formal Advertising—A Case History

by

Arthur W. Doherty

With the announcement in the *Commerce Business Daily* of January 4, 1965, that the "Bureau of Naval Weapons is contemplating the procurement of guidance, control and airframe groups for the Talos (RIM-8E) Surface-to-Air Guided Missile on a multi-year contract basis," the Navy's Surface Missile Systems Project Office initiated its first major procurement by two-step formal advertising. Ten months later, the contract was awarded at a price which was $25,000,000 and 40 percent below the programmed estimates.

The Talos guided missile, with a range over 65 miles, provides Naval forces with a long-range, surface-to-air guided missile, anti-air warfare capability. In conjunction with manned interceptor aircraft, it is used to break up and disrupt the coordination of hostile aircraft attacks far from the fleet. Talos is 32 feet long and weighs 7,800 pounds at launch. Boosted by a solid fuel rocket, it is ram jet propelled with beam riding midcourse and semi-active radar homing guidance.

In December 1964, when the Fiscal Year 1966 budget was being finalized, the Department of Defense revised the Five Year Force Structure and Financial Plan to provide for the procurement of an additional 470 Talos (RIM-8E) missiles, and an Advance Procurement Planning (APP) Council was convened by the Surface Missile Systems Project Office (SMSPO) to determine the course of action. Advance Procurement Planning Councils implement Secretary of the Navy Instruction 4200.18A, which directs active support of Department of Defense procurement objectives, including weapons acquisition at the lowest overall cost commensurate with qualitative, quantitative and delivery requirements, and the promotion of full and free competition among interested qualified suppliers.

The RIM-8E version of the Talos guided missile had been procured in each of five previous fiscal years by directed, sole-source contracts. The APP Council determined that, under breakout and directed subcontract programs associated with these previous contracts, approximately 80 percent of the manufacturing documentation had already been used for competitive procurement by the prime contractor or by the Navy; and, further, that at least two different suppliers had used the documentation with satisfactory results. This documentation, then, was obviously suitable for competitive procurement; and it was believed that with adequate Government review, and revision where necessary, the balance of the documentation could be brought into condition for competition.

With assurance from the SMSPO that resources would be made available to perform a complete documentation review, the APP Council recommended that the proposed contract be awarded, on a multi-year contract basis, by competition among qualified suppliers. It was administratively determined, later, that two-step formal advertising would be the method of competition to be employed. The responsibility for conducting the competition was assigned to the U. S. Navy Purchasing Office (NPO), Washington, D. C., which had experience in conducting this type of procurement. The task of validating the bid documentation was given to the U. S. Naval Ship Missile Systems Engineering Station (NSMSES), Port Hueneme, Calif., which maintains the data repository for the SMSPO.

To assist NPO in conducting the two-step formally advertised procurement, the SMSPO established a Talos competition team of personnel from the Talos Project Office; the engineering, production and quality assurance areas of the Bureau of Naval Weapons; NSMSES; and others with responsibility for:

- Education of participants in two-step formal advertising.
- Definition of the article to be procured.
- Orientation of the potential bidders.
- Implementation of the competition.
- Administration of the resultant contract.

Arthur W. Doherty has served as Dep. Dir., TALOS Project, in the Navy's Surface Missile Systems Project Office since 1962. During World War II he served as a Naval aviator. After the war, Mr. Doherty joined the Navy's Bureau of Aeronautics, serving as Project Engineer in the Guided Missile Division until 1951. From 1951-1962, he was employed, in turn, by the Fairchild Corp. and Grumman Aircraft.

As indicated earlier, this was the first major SMSPO procurement to be awarded by two-step formal advertising. Many benefits were derived from the experience gained from a smaller two-step procurement previously conducted by the U. S. Navy Purchasing Office, Los Angeles, and NSMSES. Nevertheless, it was necessary to acquaint both Government and industry personnel with the differences between this method and the more widely understood methods, such as advertised procurement and negotiated competition, and with the advantages of the two-step method. To the Government, one advantage is that bids can be solicited on the basis of documentation which is suitable for use only by experienced producers while retaining the integrity of the formally advertised procurement process. Advantages to industry include the unequivocal establishment in step one of their qualification to bid; complete understanding of the task through preparation, evaluation and discussion of the technical proposal; competition with others of similar qualifications; and contract award based solely upon price in step two.

A basic requirement of advertised procurement, including two-step formal advertising, is that the Government must precisely define what is to be contracted for. In the case of the Talos competition, it quickly became apparent that the concern of the APP Council with documentation review was well founded and this effort occupied many people for many months. In addition to performing a detailed engineering review of 4,500 manufacturing drawings and 5,000 specification and process sheets, NSMSES responded to inquiries from potential bidders, revised over 600 drawings and specifications and prepared lists, indices and cross references to aid the bidders. The final bid package, which included much supplementary data on tooling and test equipment, consisted of 26,750 microfilm aperture cards. Twelve such packages were mailed to potential bidders. The potential bidders, of course, played a vital role in the documentation review by pointing out errors, inconsistencies and the need for clarification.

The orientation of potential bidders, again, benefited both Government and industry. The Talos program, with roots going back to 1948, is one of the oldest guided missile programs in the country, but it was relatively little known. The Talos competition team, accordingly, publicized the competition to some extent to bring it to the attention of potential bidders. At the same time it was recognized that the preparation of bids on an item as complex as the Talos missile would be a costly procedure for industry and that the Navy had a responsibility to provide potential bidders with the maximum amount of information upon which they could base their business decisions whether to incur the considerable expense of preparing bids. To this end, not only was the data package made as complete and as accurate as possible, but an elaborate bidders' conference was held and the potential bidders were encouraged to visit the Government-owned facility in which the Talos missile was then being produced.

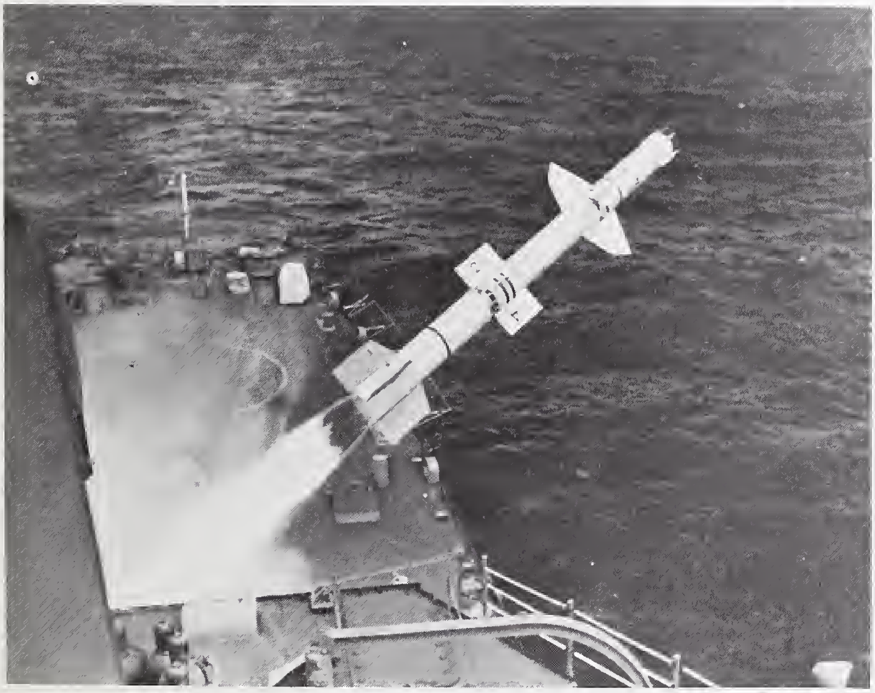
The bidders' conference was held at the U. S. Naval Weapons Station, Seal Beach, Calif. Project personnel described the complete Talos weapon system and the relation of the missile to the system, reviewed the missile subsystems and critical components in detail, and ventured an appraisal of the future of the project. Station personnel exhibited disassembled missiles and demonstrated missile checkout procedures. The inspection of the U. S. Naval Weapons Industrial Reserve Plant, Mishawaka, Ind., was conducted on a weekend in order to not disrupt production. Personnel of the office of the Bureau of Naval Weapons Representative, Mishawaka, explained manufacturing and assembly operations, quality assurance procedures and the utilization of the factory test and checkout equipment.

The final action to ensure complete industry understanding of the competition and proposed contract requirements was the detailed review with each bidder of the technical proposal he had submitted as required in the first step of a two-step procurement. All of the technical proposals were modified as a result of this review.

As industry became more and more familiar wtih the proposed task, a self-elimination process took place as evidenced by the following:

- Responses to January synopsis: 35.
- Responses to March synopsis: 23.
- Preliminary data packages mailed: 18.
- Attendees at bidders' conference: 21.
- Attendees at plant tour: 12.
- Final data packages mailed: 12.
- Technical proposals received: 5.
- Bids received: 5.

The attrition, actually, was not quite as great as indicated since two bidding teams were formed during the course of the competition and eight companies were represented in the final bidding.



Talos Missile.

The consensus of Government and industry personnel is that the Talos competitive procurement was highly successful and indicative of what can be accomplished in this area of procurement. The key to the success was the SMSPO Talos competition team, which was established to assist the Navy Purchasing Office in conducting the competition. The team was exceptionally well qualified for this pioneering effort including, as it did, personnel with experience in engineering, production, quality assurance, documentation, procurement and contract administration in both Government and industry, as well as specific experience in the Talos project. The team was also strongly motivated to prove that two-step formal advertising could be used for the procurement of as complex an item as the Talos guided missile in view of the widespread skepticism in both Government and industry. The fact that the team and bidder personnel, jointly, were able to establish the base for an equitable competition is demonstrated by the closeness of the bids and the fact that the two lowest bids were within $500 of each other.

The Talos competitive procurement again demonstrated that substantial price benefits can accrue from competition and established that two-step formal advertising can be used to obtain competition in the procurement of complex items. It also highlighted several requisites for successful competition:

- Precise definitions of all aspects at an early stage of the competition. This includes not only the documentation describing the article to be procured, but also the rules of the competition, the technical proposal requirements and evaluation criteria, and the terms and conditions of the bidding and resultant contract. Failure to meet all parts of this requirement resulted in unnecessary delays during the Talos competition.
- Provision of an experienced team in support of the Purchasing Office with authority to give it binding and unequivocal decisions as required.
- Provision of the maximum amount of useful data to potential bidders on an early and continuing basis and cooperation on the part of industry in analyzing and criticizing the data to the end that there may be a complete understanding between the buyer and the potential sellers at the end of step one as to what is being bid on in step two.

With the experience of success in two-step formal advertising behind it, the Surface Missile Systems Project Office may be expected to continue, and expand, its utilization of this method of procurement.

ABOUT PEOPLE

DEPARTMENT OF DEFENSE

Dr. Donald M. MacArthur was sworn in Feb. 21 as Dep. Dir., Defense Research & Engineering (Chemistry and Materials). Dr. MacArthur is the first to fill the newly created position and will be responsible for the technical review and evaluation of DOD research and development in the fields of chemistry and materials.

Maj. Gen. John T. Honeycutt, USA, has been named Commander of the Defense Atomic Support Agency's Field Command, Sandia Base, Albuquerque, N.M. He will succeed **RAdm. Ralph C. Johnson, USN.** The assignment became effective April 21.

Brig. Gen. John D. Hines, USA, has been reassigned as Commander of the Defense Industrial Supply Center, Philadelphia, a field activity of DSA.

Brig. Gen. John M. Kenderdine, USA, has been designated for assignment as Commander of the Defense Personnel Support Center, DSA, Philadelphia, upon the retirement of **Maj. Gen. Oliver C. Harvey, USA,** in July 1966. Gen. Kenderdine is now serving as Commander, Defense Industrial Supply Center, Philadelphia.

Roland L. Guyotte, Jr., has been appointed Executive Assistant and Senior Transportation Adviser to the Commander, Military Traffic Management and Terminal Service (MTMTS).

Col. Edward E. DuBose, Jr., USAF, has been reassigned as Chief, Data Systems Automation Office, Defense Construction Supply Center, DSA, Columbus, Ohio.

Col. William A. Fickling, USAF, has been made Chief of the Product Management Div., Defense Contract Administration Services, DSA.

DEPARTMENT OF THE ARMY

Maj. Gen. George T. Duncan has been named Dep. Commanding General, Third U. S. Army, Fort McPherson, Ga., succeeding **Maj. Gen. William C. Bullock,** who is retiring.

Brig. Gen. Julian J. Ewell succeeds **Brig. Gen. George B. Pickett, Jr.,** as Chief of Staff, U. S. Army Combat Developments Command, Fort Belvoir, Va.

Brig. Gen. Leland G. Cagwin has been selected for promotion to major general and named Commander, U. S. Army Test and Evaluation Command, Aberdeen Proving Ground, Md. **Brig. Gen. John K. Boles, Jr.,** has been assigned as Dep. Commanding General of the Test and Evaluation Command.

Brig. Gen. Alvin E. Cowan, Dir. of Developments, Office of the Chief of Research and Development, has been reassigned to the Military Assistance Command, Vietnam, as Dir., Joint Research and Test Agency.

The new Asst. Dep. Chief of Staff, Logistics, for Materiel Readiness is **Brig. Gen. Joseph M. Heiser, Jr.**

Brig. Gen. Robert R. Williams succeeds **Brig. Gen. George P. Seneff, Jr.,** as Dir. of Army Aviation, Office of the Asst. Chief of Staff for Force Development.

Brig. Gen. Stephen W. Downey, Jr., has been reassigned to the U. S. Army Combat Developments Command as Dir. of Doctrine.

Col. Philip E. Phaneuf has been named Commander of the Corps of Engineers Ballistic Missile Construction Office, Norton AFB, Calif. He replaces **Col. Robert W. Love,** who has become Missouri River Div. Engineer.

Winfred M. Crim, Jr., has been named chief of a newly established Research and Technology Dept. at the Nuclear Power Field Office, Fort Belvoir, Va.

DEPARTMENT OF THE NAVY

RAdm. Harry N. Wallin, will become Director of Facilities Engineering, Bureau of Yards and Docks, Washington, D.C. He relieves **Capt. Paul E. Seufer,** who will become Officer in Charge of Construction, Bureau of Yards and Docks, in Vietnam.

Capt. Edward G. Cunney has relieved **Capt. Fred F. Kravath,** as Director, Eastern Div., Bureau of Yards and Docks.

Capt. William R. Boyer, relieved **Capt. Greer A. Busbee,** as Dir., Caribbean Div., Bureau of Yards and Docks, Jan. 24. Capt. Busbee has been transferred to Vietnam for duty with the Officer in Charge of Bureau of Yards and Docks Construction.

DEPARTMENT OF THE AIR FORCE

The following Air Force officers have been nominated for promotion to major general: **Brig. Gen. John L. McCoy,** Dep. Commander for Minuteman, Ballistic Systems Div., AFSC, Norton AFB, Calif.; **Brig. Gen. Harry L. Evans,** Vice Dir., MOL Program, Office of the Secretary of the Air Force; **Brig. Gen. Woodrow P. Swancutt,** Dep. Dir., Operations for Forces, Office of Dep. Chief of Staff (Plans and Operations); **Brig. Gen. Wendell E. Carter,** Dep. Chief of Staff, Comptroller, AFSC; **Brig. Gen. Jewell C. Maxwell,** Dir., Supersonic Transport Program, FAA; **Brig. Gen. Hugh B. Manson,** Commander, Air Force Flight Test Center, AFSC, Edwards AFB, Calif.; **Brig. Gen. Andrew J. Evans, Jr.,** Dir., Development, Office of Dep. Chief of Staff (Research and Development); **Brig. Gen. Kenneth C. Dempster,** Dep. Dir., Operational Requirements, Office of Dep. Chief of Staff (Research and Development); and **Brig. Gen. James T. Stewart,** Dir., Office of Space Systems, Office of the Secretary of the Air Force.

Selections for promotion to the grade of brigadier general are as follows: **Col. Harold V. Larson,** Dir., Military Assistance, Office of Dep. Chief of Staff (Systems and Logistics); **Col. Gustav E. Lundquist,** Dep. Commander, Rome Air Development Center, AFSC, Griffiss AFB, N. Y.; **Col. Harold C. Teubner,** Asst. for Research and Development Planning, Office of Dep. Chief of Staff (Research and Development); **Col. Harmon E. Burns,** Dir., Maintenance Engineering, Office of Dep. Chief of Staff (Systems and Logistics); **Col. John H. Harring Jr.,** Dep. Dir., General Purpose and Airlift Studies, Office of Dep. Chief of Staff (Plans and Operations); **Col. Kenneth W. Schultz,** Dep. for Ballistic Missile Re-Entry Systems, Ballistic Systems Div., AFSC, Norton AFB, Calif.; **Col. Louis L. Wilson, Jr.,** Chief, Strategic Div., Office of Dep. Chief of Staff (Research and Development); **Col. James O. Lindberg,** Dir., Materiel Management, Sacramento Air Materiel Area. AFLC, McClellan AFB, Calif.; **Col. William C. Pratt,** Dir., Data Automation, Office of the Comptroller of the Air Force; **Col. Buddy R. Daughtrey,** Exec. Asst. to the Secretary of the Air Force; **Col. Albert J. Bowley,** Exec. to the Vice Chief of Staff; and **Col. Robert E. Lee,** Dir., Procurement Policy, Office of Dep. Chief of Staff (Systems and Logistics).

Brig. Gen. Glenn A. Kent has been selected for promotion to major general and reassigned from duty as Dep. Dir. for Development Plans to Dep. for Research and Development Analysis, Office of Dep. Chief of Staff (Research and Development).

Brig. Gen. Henry B. Kucheman, Jr., became Dep. for Limited War at Aeronautical Systems Div., AFSC, Wright-Patterson AFB, Ohio, on Feb. 2.

The following are new assignments within the Air Force Systems Command: **Col. Benjamin N. Bellis,** System Program Director for the F–12/SR–71, Aeronautical Systems Div., Wright-Patterson AFB, Ohio; **Col. Roland L. Bell,** System Program Dir., Secure Communication, Electronics Systems Div., L. G. Hanscom Field, Mass.; **Col. Willard B. Helms,** System Program Dir., Survivable Communications, Electronic Systems Div., L. G. Hanscom Field, Mass.; **Col. Edwin W. Brown,** Vice Commander, Arnold Engineering Development Center, Arnold AFS, Tenn.; and **Col. Wilbur H. Edwards,** Dir., Requirements MOL, Space Systems Div., Los Angeles, Calif.

BIBLIOGRAPHY

DOD Directive 5100.50, "Environmental Pollution Control," Jan. 4, 1966. Provides a coordinated approach to, and effective use of DOD resources in, the control of environmental pollution. The directive establishes a DOD Environmental Pollution Control Committee comprising engineering, medical and other representatives of the Military Departments and the Defense Supply Agency.

DOD Instruction 5210.49, "Security Classification Guides for DOD Construction Projects," Jan 13, 1966. Provides general guidelines for preparing security classification guides for individual defense construction projects. It is not intended as an index for mechanical classification of information.

DOD Directives and instructions may be obtained from:
Publications Distribution Branch, Office of the Secretary of Defense
Room 3B200, The Pentagon
Washington, D. C. 20301

Defense Procurement Circular No. 39, March 16, 1966. (1) Small Purchase Procedures. (2) Filing Notices of Assignment and Instruments of Assignment. (3) Value Engineering, DPC No. 11. (4) Pre-Award Surveys. (5) Federal Excise Taxes.

Each Defense Procurement Circular is designed to place new or changed policy or procedures in effect prior to publication of an Armed Service Procurement Regulation (ASPR) revision. ASPR subscribers will receive DPC's and ASPR revisions through the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Development of Equipment and Procedures for Producing Large Quantities of Foamed Sulphur in the Field. Southwest Research Institute, San Antonio, for the Air Force, Jan. 1966, 24 pp. Order AD–628 064 $1

Research on Organic Depolarizers. Monsanto Research Corp., for the Army, June 1964, 186 pp. Order AD–454 913 $5

Electrochemistry of Fuel Cell Electrodes. Tyco Laboratories, Waltham, Mass., for the Navy, Nov. 1965, 116 pp. Order AD–628 071 $4

High Pressure Performance of Voltaic Cells. Naval Civil Engineering Laboratory, Port Hueneme, Calif., Jan. 1966, 19 pp. Order AD–627 931 $1

Some Theoretical Aspects of the Improvement of Document Screening by Associative Transformations. Westat Research Analysts, Denver, Colo., for the Air Force, Nov. 1965, 53 pp. Order AD–628 191 $3

A Unifying Mathematical Theory for Training Learning Nets. Bell Aerosystems Co., Buffalo, N.Y., for the Air Force, Oct. 1965, 100 pp. Order AD–627 908 $3

Replab—A Study in Scientific Inquiry Using the Plato System. University of Illinois for the Army, Dec. 1965, 36 pp. Order AD–627 076 $2

Human Factors Engineering Design Standard for Missile Systems and Related Equipment. Human Engineering Laboratories, Aberdeen Proving Ground, Sept. 1965, 254 pp. Order AD–623 731 $6

Effects of Display Quickening of Human Transfer Functions During a Dual-Axis Compensatory Tracking Task. North American Aviation, Columbus, Ohio, for the Air Force, Nov. 1965, 220 pp. Order AD–627 671 $6

Thermal Stability of Hydrocarbon Fuels. Phillips Petroleum Co., Bartlesville, Okla., for the Air Force, Aug. 1965, 124 pp. Order AD–621 531 $4

Further Results of Acoustic Radiation from a Finite Cylinder. Parke Mathematical Laboratories, Carlisle, Mass., for the Navy, Jan. 1966, 57 pp. Order AD–628 127 $3

Calculation of the Monostatically Reflected Velocity Potential in the Far Field of Certain Finite Rigid Bodies. Naval Research Laboratory, Washington, D.C., Dec. 1965, 36 pp. Order AD–626 934 $2

Leading-Edge Wedges to Reduce the Drag of Thick Wings at Supersonic Speeds and to Increase Lift at Low Speeds. Navy's David Taylor Model Basin, Washington, D.C., Aug. 1965, 36 pp. Order AD–626 655 $2

Experimental Evaluation of Head-Up Display High-Brightness Requirements. Kaiser Aerospace & Electronics, Palo Alto, Calif., for the Air Force, Nov. 1965, 32 pp. Order AD–626 657 $2

Seaworthiness Characteristics of Ground Effect Machine Obtained from Model Tests Over Regular Waves. Navy's David Taylor Model Basin, Washington, D.C., Dec. 1965, 34 pp. Order AD–627 250 $2

Reactions of Free Radicals Containing Nitrogen. Edward Davies Chemical Laboratory, Aberystwyth, Wales, for the Air Force, Oct. 1965, 11 pp. Order AD–627 816 $1

Ignition Theory: Application to the Design of New Ignition Systems. Naval Ammunition Depot, Crane, Ind., Nov. 1965, 22 pp. Order AD–627 257 $1

Plasma Jet Chemistry. Temple University for the Air Force, Dec. 1964, 37 pp. Order AD–625 591 $2

Eleventh Annual Chemistry Program Review. Air Force Office of Scientific Research, Nov. 1965, 257 pp. Order AD–627 666 $6

Mass Spectrometric Studies of Reactions in Flames—Quantitative Sampling of Free Radicals from One-Atmosphere Flames. Midwest Research Institute, Kansas City, Mo. for the Advanced Research Projects Agency, July 1965, 26 pp. Order AD–466 801 $2

Thermodynamic and Composition Data for Constant Volume Combustion of Stoichiometric Mixtures of Hydrogen-Oxygen Diluted with Helium or Hydrogen. University of Toronto for the Air Force, Aug. 1965, 203 pp. Order AD–623 942 $6

Transition Metal Complexes as Potential Semiconductors, Clark University, Worcester, Mass., for the Navy, Dec. 1965, 114 pp. Order AD–627 705 $4

A Study of Band Edge Distortion in Heavily Doped Germanium. Air Force Cambridge Research Laboratory, Oct. 1965, 91 pp. Order AD–627 003 $3

Infrared Maser Interferometry for Time and Space Resolution of Electron Density in High-Temperature Plasmas. University of Texas for the Air Force, July 1965, 132 pp. Order AD–625 939 $4

Government research and development reports are available to science and industry at price indicated from:
Clearinghouse for Federal and Scientific Information
Department of Commerce
Springfield, Va. 22151
Authorized DOD contractors and grantees may obtain these documents without charge from:
Defense Documentation Center
Cameron Station
Alexandria, Va. 22314

Navy Reorganizes Material Command Structure

The Navy has announced plans for a sweeping reorganization which will result in the creation of a new Naval Material Command concentrating direct authority in the Chief of Naval Operations.

According to the plan, which the Navy hopes to place in effect on May 1, the present bilinear Navy organizational structure will be replaced by a unilinear framework placing the material, medical and personnel supporting organizations under command of the Chief of Naval Operations, Admiral David L. McDonald.

The reshuffle includes the reorganization of the Naval Material Support Establishment into a new Naval Material Command consisting of six systems commands.

Under the new structure, the Bureau of Weapons, Bureau of Supplies and Accounts, Bureau of Ships and Bureau of Yards and Docks will emerge as the Air Systems, Ship Systems Electronic Systems, Ordnance Systems, Supply Systems and Facilities Engineering Commands.

Vice Admiral Ignatius J. Galantin, Chief of Naval Material under the current structure, will command the new Naval Material Command.

The four present bureau chiefs and two additional rear admirals will head the six systems commands.

When the reorganization plan becomes operational, only two of the present six bureaus, Personnel, and Medicine and Surgery, will still exist in that name, and they will report to the Secretary of the Navy through the Chief of Naval Operations.

The reorganization abolishes the bilinear Navy organization under which command of the operating forces ran from the Secretary of the Navy through the Chief of Naval Operations and the Commandant of the Marine Corps to the fleet and field, while maintaining the forces was administered by the Secretary, through the Assistant Secretaries and the Chief of Naval Material, to the material bureaus and the Special Projects Office.

It is expected that the structure of the new Naval Material Command will strengthen the systems management approach to weapons development and acquisition.

The commanders of the six new functional commands of the Naval Material Command will have the same stature as do the Chiefs of the Bureaus which they replace.

The officers selected to command the functional commands are:

- Air Systems Command—Rear Admiral Allen M. Shinn.
- Ships Systems Command—Rear Admiral Edward J. Fahy.
- Electronic Systems Command—Rear Admiral Joseph E. Rice.
- Ordnance Systems Command—Rear Admiral Arthur R. Gralla.
- Supply Systems Command—Rear Admiral Herschel J. Goldberg, SC.
- Facilities Engineering Command—Rear Admiral Alexander C. Husband, CEC.

Although the titles of the Bureau of Supplies and Accounts (Supply Systems Command) and Bureau of Yards and Docks (Facilities Engineering Command) are changed by the new organization, there will be no major reassignment of the responsibilities of those bureaus.

Responsibilities of the other four commands, which will be constructed from the Bureau of Ships and Bureau of Naval Weapons, will be as follows:

Air Systems Command.

- Aircraft, complete (airframes, engines, etc.).
- Air-launched weapon systems, complete, including airborne aspects of torpedoes and mines.
- Airborne electronics, complete.
- Air-launched underwater sound systems.
- Airborne pyrotechnics.
- Astronautics, including project management of SPASUR.
- Catapults, arresting gear and visual landing aids.
- Airborne mine sweeping equipment.
- Aircraft drone and target systems.
- Land-based targets for air weapons.
- Air systems special support equipment.
- Photographic and meteorological equipment.
- Active and reserve air systems maintenance and support.

Ships Systems Command.

Ship systems design and integration for all displacement type ships, ground effect machines (GEM), or hydrofoil craft.

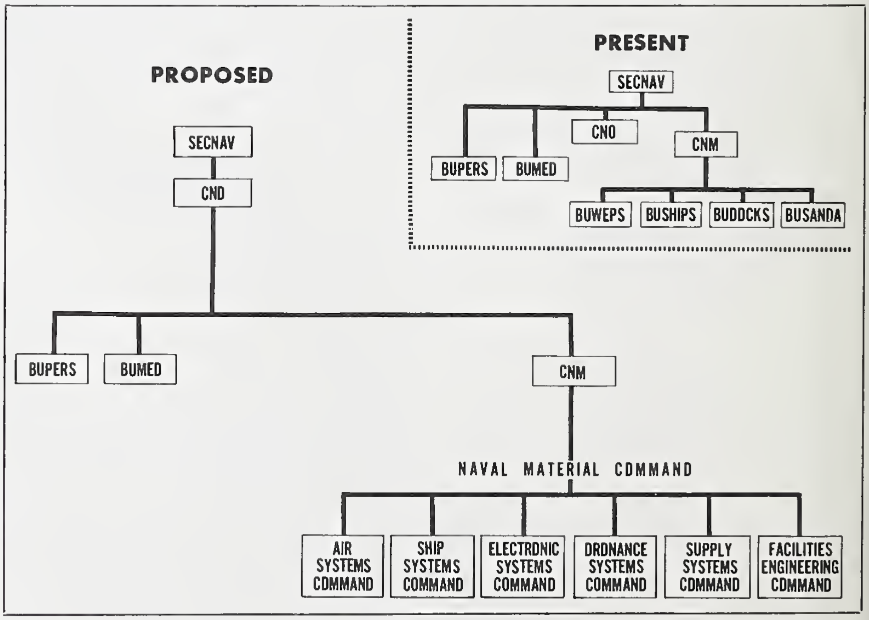
- Ship construction, overhaul, modernization and conversion.
- Ship propulsion, complete.
- Ship auxiliary power generating and distribution systems.
- Ship navigational equipment.
- Ship habitability and environmental control features.
- Ship-mounted sonar: research, engineering, acquisition and support.
- Ship-mounted search radar.
- Antenna design and integration.
- Naval Tactical Data System.
- Rescue and salvage systems.
- Active and reserve ship maintenance and support.
- Degaussing.
- Shipborne mine sweeping equipment.

Electronics Systems Command.

- Shore (ground) electronics, complete.
- Shipboard electronic equipment, under system control of SSC, as follows: communications; IFF; ECM; navigation aids; air traffic control (all less antenna systems).
- SOSUS.
- Material support of Air Systems Command for following electronics equipment navigation aids, air traffic control, meteorology.
- Space programs as follows: SATCOM and material support of SPASUR.
- Shore-based strategic data systems: OPCON centers.
- Data-link systems (external to ships and aircraft).
- Radiac equipment (less installed shipboard monitoring systems).
- General purpose electronic test equipment and common components, techniques and services.
- Technical authority for electronic standards and compatibility.

Ordnance Systems Command.

- Shipboard weapon systems, including functional responsibility for



fire control radar, fire control equipment, weapons direction equipment, switchboards, launchers and expendables.

- Ship-mounted sonar: programing and control of system performance, technical characteristics and configuration.
- Air-launched underwater weapons: torpedoes and mines under system control of ASC.
- Explosive safety.
- EOD, small arms, demolition, infantry equipment, harbor defense equipment, ship pyrotechnics.
- Seaborne targets.
- Special support equipment for above.
- Research and exploratory development of explosives.

In addition to improving the overall coordination of the Navy's support activities in the areas of material, medicine and personnel by assigning responsibilities for these total functions to the Chief of Naval Operations, it is expected that the new organization will accomplish the following purposes:

- Affirm and strengthen the systems management approach to weapons development and acquisition.
- Reinforce the management strength of the functional organizations under the Chief of Naval Material; achieve more balanced and efficient spans of control and give more emphasis to ordnance and electronics.
- Centralize and improve the coordination of research, development, test and evaluation (RDT&E) management.
- Place more emphasis on the logistic support and maintenance of weapon systems.
- Increase the efficiency and economy of the Navy's material organization by exploiting opportunities for consolidation of common services.

Navy Reorganization Briefings Set

The reorganization of the Naval Material Command will be explained to industry representatives at three briefings to be held in Long Beach, Calif. and Washington, D.C.

Vice Adm. I. J. Galantin, Chief of Naval Material, will be on hand at the meetings to explain the Navy-USMC material program and introduce speakers who will outline the structure of the new Naval Material Command.

Briefings will be held as follows:

April 26: Navy/National Security Industrial Assn. Briefing, Departmental Auditorium, 12th and 14th Sts. NW on Constitution Ave., Washington, D.C.

May 2: American Ordnance Assn./Navy League Briefing, Statler-Hilton Hotel, Washington, D.C.

May 3: Navy/National Security Industrial Assn. Briefing, U. S. Naval Base, Long Beach, Calif.

Industry Cooperation Sought To Improve Effectiveness of DOD Education and Training

by

Thomas D. Morris

Asst. Secretary of Defense (Manpower)

The Department of Defense operates the world's largest education and training establishment spending over four billion dollars a year in this area. Although the Military Departments have been leaders in the use of various new instructional methods, the Department of Defense must constantly continue seeking ways to improve the quality and effectiveness of its education and training programs. We have learned through our experiences in the weapon system acquisition process that industry can play an important role through its application of advanced technologies and systems management concepts. We are now asking industry to explore the potential of applying these same capabilities to DOD's education and training areas.

To facilitate this endeavor DOD, with the participation of the Office of Education and in affiliation with the National Security Industrial Association, is planning a briefing-conference on June 14-15 in the Washington, D.C., area. A major objective of the conference will be to make industry aware of the magnitudes and kinds of DOD training and education programs and the procedures by which policies in these areas are formulated. If the systems approach to training problems is to have a meaningful impact on the quality of training, the interrelationship between all phases from personnel procurement through training utilization and retention must be understood by those who would seek to solve particular problems.

During this conference, representatives from the Military Departments, the Office of the Secretary of Defense and the Office of Education will briefly describe areas of priority concern and particular training needs which industry might want to explore. These priority areas will range from the development of better management techniques of education, training, and directly related support activities to the feasibility of the application of new teaching devices and equipment such as computer-assisted instruction.

Over the last two or three years there has been increasing interest on the part of both Federal and state governments, as well as industry, to utilize the systems approach in seeking new, effective solutions to old public service problems, such as transportation, education, pollution and areas other than weapons procurement. The State of California has found that the same companies which put men into orbit can also determine effective means to prevent crime, abate pollution and design statewide transportation systems.

The experience of the Job Corps has shown that systems teams of defense-oriented companies can also apply their skills to managing and operating effective training centers. Although industry has always provided the majority of goods used in our support areas, the DOD is now encouraging industry to provide more efficient innovations in support areas. For example, four studies were recently completed by industry for the DOD on the feasibility of applying systems engineering and management concepts to the provision of health care for military personnel by a fixed medical facility which will incorporate the latest technological advances in medical science and engineering. Most of the companies who received contracts are already in the defense weapons business; their flexibility to meet the demands of a Defense budget whose composition is constantly shifting is encouraging. We feel that the same approach applied to improving the quality of health services for the military can also be applied to our education and training areas.

The purpose of the June conference will be to develop a rapport between industry and the DOD early in the planning stages of a concerted effort to improve the quality of one of our largest support areas. The merits of the DOD-industry partnership approach in our weapon system acquistion process is self-evident; a similar approach to the education and training support area offers extreme promise.

For further information and attendance applications contact:

Mr. Paul A. Newman
National Security Industrial Association
Suite 800
1030 15th St. NW
Washington, D.C.
Phone: (Area Code 202) 296-2266

Trends in Air Force Research and Development

by

Gen. John P. McConnell

Trends in Air Force research and development may seem rather remote from the urgent military demands which we must meet today and in the immediate future. But my trip to Southeast Asia last October served as a compelling reminder to me that the decisive role of airpower in Vietnam is being made possible mainly by airplanes and equipment that have been conceived and developed years ago. By the same token, the Air Force's effectiveness in future conflicts of any type and intensity will depend largely on an operational inventory of weapon systems that are now in various stages of development or, perhaps, have not even been conceived as yet.

To bring my subject in proper focus, let me remind you that military power serves as an indispensable tool in the conduct of our foreign affairs and that, therefore, our statesmen must be backed by superior capability across the entire spectrum of warfare. This gives them the option to apply military pressure or force in whatever manner and to whatever degree they consider necessary for the protection of our national interests.

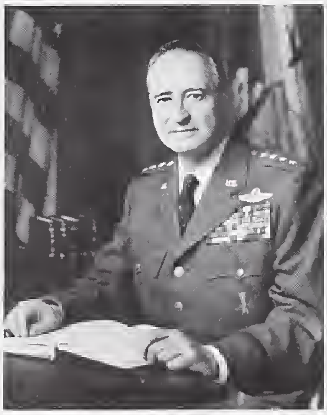
Such overall military superiority can no longer be achieved and maintained without overall technological superiority. As a result, we are engaged in a technological war which poses many problems as well as challenges. One of our most difficult tasks in that war is to assess accurately the technological capabilities of our opponents and to prevent technological surprise. Nor is it enough to try to keep up with the rapid progress of our opponents; we must retain the initiative and endeavor to stay far ahead of them. That is why we must have a vigorous research and development program.

Needless to say, the mounting cost of the technological war compels us to set some limits to the expansion of our defense effort. It is, therefore, essential that our research and development programs are carefully selected and directed primarily toward those objectives which can be expected to be the most important in carrying our national strategy and supporting national policy.

In analyzing the factors which determine military research and development objectives we must keep in mind that some of our future requirements are fairly predictable, while others may arise quite suddenly because of events or international developments that are unpredictable. Considering the long lead times in the development of advanced weapon systems, the logical approach is to plan our future force structures on the basis of predictable trends but to keep flexible enough to adapt ourselves to any changes that may become necessary or desirable.

Despite these restrictions we have a fair degree of latitude in deciding on the direction in which we want to go. It is true that we may have only limited control over future changes in the international, military and technological situation and, hence, cannot predict the exact nature and timing of such changes. On the other hand, prevailing trends as a rule are indicative enough to guide our overall planning and, thereby, perhaps exert some control over future events or actions that could be inimical to our national interests.

To this end, our military research and development objectives must be determined through a number of steps. The first step is the appearance and identification of a threat to our national interests and security. The next step is the decision at national level to meet that threat and, subsequently, the establishment of a national strategy of how to meet it. Depending on the nature and expected duration of the threat, established national strategy then may call for certain research and development programs which, eventually, result in the new operational systems required for implementing that strategy.



Gen. John P. McConnell
Chief of Staff
U. S. Air Force

Of course, this cycle is not always as simple and neat as it may appear. The threat as well as national strategy may change quite suddenly and profoundly. Several types of threats may occur simultaneously. Unexpected conditions and problems, budgetary considerations or, perhaps, technological breakthrough may make it necessary to reorient, modify, or discontinue a particular research and development program. But these and other deviations from the cycle I described do not alter the basic relationships between threat, strategy, weapon systems and national security on one hand, and research and development on the other.

There has been growing awareness of these relationships since the end of World War II when it became clear that the primary threat to our security and world peace would be posed by the aggressive and expansionist policies of the Soviet Union. This basic threat remains except that it is now being expanded by the Red Chinese and, thus, has become a two-pronged and truly global communist threat.

What has changed, however, is the nature and complexity of the threat, and both our national strategy and force structures have had to change accordingly. The loss of our initial atomic monopoly and the rapid growth of the Soviets' military and nuclear capabilities compelled us to reinforce a national strategy of containment with nuclear deterrence through the threat of massive retaliation. When there was growing need for the capability to respond appropriately and effectively at all levels of conflict, Secretary McNamara in 1961 directed a major force realignment. The purpose of the realignment was to support a strategy of deterrence at all levels through the credible capability of countering successfully and decisively any act of aggression on whatever level it may occur.

These changes in the nature of the threat and ensuing changes in overall national strategy have been reflected in the decisions which have shaped research and development in terms of required weapon systems and supporting technology. For instance, our previous strategy of massive retaliation resulted in emphasis on the development of strategic delivery systems and led to the successive development of the B-47, B-52 and B-58 bombers. With advancing nuclear and missile technology, this was followed by the intensive development of operational ballistic missiles and the resulting mixed force of both manned and unmanned strategic weapon systems. At the same time, the mounting threat of nuclear aggression on the part of the Soviets necessitated the development of an extensive warning and defense system against hostile bombers and, subsequently, of the Ballistic Missile Early Warning System against a possible Soviet missile attack.

When we adopted our current strategy the Air Force placed increased emphasis on providing weapon systems that could be employed in actions at all levels, nuclear as well as conventional. In addition to strengthening the Air Force's general purpose forces, the manifold demands of our strategy also required increased attention to the airlift forces as well as to various support areas, such as command and control, communications, and others essential to combined air-ground operations in limited conflicts. This shift in emphasis, however, did not involve an impairment of our nuclear deterrent and general-war strength, i.e., our capability to respond at the highest level of conflict. In fact, this capability has been steadily improved.

From what I have said so far, it should be evident that we can plan our major research and development objectives for as far into the future as we can anticipate the nature and scope of the threat or threats we may have to meet. This is not too difficult for the immediate future because we are fairly safe in projecting past and current international and technological trends some years ahead. But, needless to say, this projection becomes increasingly speculative as we delve deeper into the future, because of the unpredictable factors which I mentioned earlier.

Of course, we can anticipate with some degree of assurance that the overall communist threat to our security and world peace will persist for many years to come. We can also expect that any lesser threats that may arise, predictably or unpredictably, will be designed somehow to foster the avowed communist objective of achieving world domination by any means whatever. But as far as military research and development are concerned, the only firm conclusion we can draw is that we must continue to strive for overall superiority in a technological war, the end of which is not in sight.

To meet this very broad demand, we should think in terms of near-term, mid-term and long-range research and development objectives. This division is more or less arbitrary and is mainly an indication of the degree of flexibility we must maintain the further ahead we attempt to plan.

To illustrate this and the other points I have made, let me discuss briefly some current and projected research and development objectives pertaining to three major areas of the overall communist threat—the nuclear-strategic threat, the limited-war threat and the space threat.

As I stated earlier, the prospects for the persistence and expansion of the nuclear-strategic threat compel us to take all steps necessary to insure the preservation of our nuclear superiority against any contingency and for an indefinite period. I might add that such superiority not only must serve to deter nuclear aggression; it must also give our statesmen freedom of action in dealing effectively with any conflict of lower intensity without undue risk of precipitating nuclear war.

With some 1,400 ICBM's and Polaris missiles, as well as almost 700 strategic bombers in our inventory, we do have unquestionable nuclear superiority today and for the immediate future. But as the communist nations keep striving for advances in their nuclear offensive and defensive capabilities, we could easily lose that superiority unless we can match, step by step, any technological progress they may make.

For instance, the Soviets are doubtless engaged in a major effort to create an effective defense system against our strategic missiles. It is, therefore, essential that we develop means for insuring warhead penetration to the target against any predictable missile defenses, such as batteries of anti-missile missiles. These means may include a variety of electronic and mechanical penetration aids, and decoys which would make defense against them not only very complicated but also extremely costly.

At the same time, we must endeavor to make continuing advances in our missile technology so as to keep up with any progress the communist nations might achieve. Despite the dramatic progress we have made in the accuracy, reliability, survivability and reaction capability of our missiles, I have little doubt that future generations of missiles will be as far advanced over the present one as this generation is over our first ballistic missiles.

There is, however, one factor we must take into account, and that is the possibility that a technological breakthrough may lead to a revolutionary principle of missile defense which would be virtually impenetrable to even the most advanced missiles. Should we be the first to develop such a system, our strategic posture would be strengthened immeasurably. But if the Soviets should surprise us with such a missile defense system, our deterrent could be seriously impaired, especially if that deterrent were based primarily or solely on strategic missiles.

This possibility, however remote it may seem today, is one compelling argument in favor of retaining a mixed force of missiles and bombers. In addition to the invaluable flexibility provided by such a mixed force, the bombers conceivably may have to serve as penetration aids for our missiles. But our present force of strategic bombers is rapidly becoming obsolete and, while we will be needing fewer bombers to complement our still growing missile inventory, these aircraft must be advanced enough to be able to operate in the more sophisticated environment of the future.

As Secretary McNamara announced recently, it is planned to replace earlier models of the B-52 with a version of the F-111 tactical fighter, to be known as the FB-111, which will be a dual-purpose strategic and tactical bomber. Current plans call for some 210 FB-111's to be operational by 1971 which will give us a sizable fleet of highly advanced and versatile bombers. For the future I believe that it is highly desirable to pursue the development of what is known as the Advanced Manned Strategic Aircraft (AMSA) with performance characteristics exceeding even those of the FB-111. An AMSA would incorporate every feature found desirable in long-range strategic operations, including large payload capacity. This payload could consist of nuclear weapons, missiles, conventional bombs, or any other type of munitions.

The large payload capacity of the long-range strategic bomber is proving most useful right now in Vietnam. A number of B-52's, converted to carrying conventional munitions, are being employed for area-bombing of widespread enemy installations and troop concentrations in South Vietnam and for depriving the enemy of any sanctuary throughout the vast expanse of the jungle. The B-52's have been so successful in this role that they are now being modified to carry, in a single aircraft, over 100 500-pound bombs or equivalent combinations.

But just as we do not plan to eliminate the bomber from our strategic forces, we must anticipate that a Soviet bomber threat will continue to face us for some time to come, in addition to their missile threat. This means that we must continue to maintain our bomber warning system and manned interceptors which can cope with the threat.

We are flight-testing the prototype of a new interceptor now, the YF-12A. Equipped with an advanced fire control system and highly maneuverable air-to-air missile, it can engage targets flying at low or very high altitudes. Its high cruise speed and very long range would permit its rapid deployment to any threatened area in the world.

These few examples show that the nuclear-strategic threat entails a great diversity of tasks for Air Force research and development, with objectives ranging all the way from near-term to the indefinite future. The emphasis is more on near-term objectives in the next area I want to discuss, the limited-war threat.

Here, too, the trend of the threat is clearly established for years to come. But the ensuing research and development objectives are more immediate and better defined, both because of the acuteness of the threat and because of our actual experiences in local conflicts, especially in Vietnam. One of the most important lessons we have learned in the Vietnamese war is the demonstration that airpower has assumed a primary and expanding role in limited wars and anti-guerrilla warfare.

To understand the future significance of this lesson we must remember that the communists, deterred from waging general nuclear war, have been trying to achieve their global objectives by fomenting and supporting local conflicts, ranging from internal insurrection to open aggression. Our commitments as well as our own national interests have compellled us to participate in a considerable number of such conflicts during the past two decades.

There can be little doubt that the communists will continue to encourage and support local conflicts in widely separated parts of the world. We must, therefore, endeavor to deter armed aggression and limited wars by resorting to the same principle which has been successful in deterring nuclear aggression and general war, that is, a credible capability to make aggression at any level too costly to the responsible parties. The Air Force must contribute a major share to that overall capability, and increasingly so at the lower levels of conflict.

It is true that airpower has been used effectively in all the local conflicts in which we have been involved since the end of World War II. But the primary role of airpower in fighting limited wars has never before been demonstrated as dramatically as is now the case in Vietnam. The great effectiveness of our air operations in that war was impressed on me during my trip to Southeast Asia last October when I had the opportunity to visit a number of bases and talk to hundreds of men of all ranks. But it was readily apparent that this effectiveness was due primarily to the extraordinary ingenuity and resourcefulness of our men in making optimum use of the airplanes and equipment available to them.

It must be understood that we have to use aircraft which are in our present operational inventory and which are not necessarily designed for the kind of counterinsurgency warfare we are conducting in Vietnam. I do not mean to imply that most or much of the equipment available to us in Vietnam is obsolete or unsuitable. Nor do I propose that we should tailor a major portion of our aircraft inventory to fit the specific conditions and environment with which we have to cope in Vietnam today. We certainly cannot afford to become overequipped with such specialized aircraft, and we may not always enjoy the "permissive environment" in which we are now operating, that is, virtually unchallenged rule of the skies.

But I do feel that the lessons we have learned in Vietnam point up the need for providing the Air Force's general purpose forces with more advanced and suitable aircraft for their expanding role in limited conflicts. This need may well be met by several types of aircraft which are now in various stages of development or under consideration.

Proposed versions of a Light Armed Reconnaissance Aircraft would permit its use for strike and defense suppression missions as well as a most suitable aircraft for our Forward Air Controllers. As you may know, these men, even in their light observation planes, have established a remarkable record in Vietnam in spotting enemy attackers and directing South Vietnamese and American strike aircraft against them. The previously mentioned YF-12 would be invaluable under conditions where we do not enjoy sole possession of the sky and where our transports and helicopters would be subject to attack by enemy fighters.

Our airlift forces, which provide the mobility so vital to the management of crises as well as in the conduct of local wars, will be strengthened greatly by the recently operational C-141 transport and, later, by the huge C-5A which is now under development. The Air Force is also interested in several projects for the development of a V/STOL, that is, an aircraft that can take off and land vertically or in a very short space. Such an aircraft may prove very useful for assault airlift, in addition to other tactical missions.

I will not dwell on our extensive research and development efforts in the supporting areas, in equipment and in special munitions for conventional wars in this article. May it suffice to say that the future will find the Air Force ever better prepared and equipped in every respect to carry out its mission at any level of conflict.

And now a brief word about the space threat. It is still too early to speak about such a threat except in terms of potential. Nor can we foretell whether that threat would be posed by the Soviets alone, by the Red Chinese, or conceivably by some other nation which, in the course of time, may acquire an offensive space capability.

But, in the first place, our future security demands that we look far ahead with regard to any potential space threat. Secondly, history shows that military weapons and strategy tend to exploit every possible medium for offensive action, and we must assume that this might also be true for space. Our only alternative, therefore, is to learn as much as we can about the space medium so that, if and when a threat should begin to materialize, we have the

(*Continued on Page* 21)

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

APRIL 1966

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

MAY 1966

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

JUNE 1966

SPEAKERS CALENDAR

OFFICE OF THE SECRETARY OF DEFENSE

Mr. William B. Petty, Dir., Defense Contract Audit Agency, at Los Angeles Chapter Meeting, California Society of Certified Public Accountants, Los Angeles, Calif., May 17.

Mr. Henry A. Wallace, Regional Manager, Los Angeles Region, Defense Contract Audit Agency, at Los Angeles Chapter Meeting, California Society of Certified Public Accountants, Los Angeles, Calif., May 17.

RAdm. Robert H. Northwood, USN, Commander Defense Electronic Supply Center, Defense Supply Agency, Dayton, Ohio, at Armed Forces Day Luncheon, Youngstown, Ohio, May 19.

DEPARTMENT OF THE ARMY

Lt. Gen. William F. Cassidy, Chief of Engineers, at American Power Conference Luncheon, Chicago, Ill., April 27.

Gen. Frank S. Besson, Jr., Commanding General, Army Materiel Command, at Annual American Ordnance Assn. Meeting, Washington, D. C., May 5.

Hon. William M. Hawkins, Asst. Secretary of the Army (Research & Development), at DOD Industry Meeting, St. Louis, Mo., May 4-5.

Maj. Gen. Francis S. Greenlief, Dep. Chief, National Guard Bureau, Annual American Ordnance Assn. Meeting, Washington, D. C., May 5.

Maj. Gen. Roland B. Anderson, Commanding General, Army Weapons Command, at Annual American Ordnance Assn. Meeting, Washington, D. C., May 5.

Maj. Gen. Charles Billingslea, Dep. Commanding General, Army Combat Developments Command, at Annual American Ordnance Assn. Meeting, Washington, D. C., May 5.

Hon. Stanley R. Resor, Secretary of the Army, at Armed Forces Day Observance, New Orleans, La., May 18-19.

Lt Gen. L. J. Lincoln, Dep. Chief of Staff (Logistics), at Industrial College of the Armed Forces National Security Seminar, Pittsburg, Pa., May 19-20.

Gen. Harold K. Johnson, Chief of Staff, U. S. Army, at Armed Forces Day Observances, Fort Benning, Ga., May 19; Atlanta, Ga., May 19; St. Paul, Minn., May 21; and Kansas City, Mo., May 21.

DEPARTMENT OF THE NAVY

VAdm. I. J. Galantin, Chief of Naval Material, at Navy/National Security Industrial Assn. Briefing on Naval Material Command, Departmental Auditorium, Washington, D. C., April 26; at American Ordnance Assn./Navy League Briefing on Naval Material Command, Statler-Hilton Hotel, Washington, D. C., May 2; at Navy/National Security Industrial Assn. Briefing on Naval Material Command, U. S. Naval Base, Long Beach, Calif., May 3.

Hon. Paul H. Nitze, Secretary of the Navy, at Surgeon Generals Conference, Washington, D. C., April 27; at National Convention of the Navy League, Santa Monica, Calif., May 27.

Adm. David L. McDonald, Chief of Naval Operations, at Army War College, Carlisle Barracks, Pa., April 28; at Air War College, Montgomery, Ala., May 23.

Capt. George L. Street, Commander Submarine Group, Mare Island Naval Shipyard, at Armed Forces Day Observance, Detroit, Mich., May 17.

RAdm. H. J. Goldberg, Chief, Bureau of Supplies & Accounts, at National Defense Transportation Assn. Meeting, New Orleans, La., May 20.

RAdm. E. R. Zumwalt, Commander Cruiser-Destroyer Flotilla 7, at Armed Forces Day Luncheon, Fresno, Calif., May 20.

RAdm. E. J. Fahey, Chief, Bureau of Ships, at 20th Annual Naval-Civilian Administration Assn. Conference, Washington, D. C., May 23.

DEPARTMENT OF THE AIR FORCE

Gen. J. P. McConnell, Chief of Staff, U. S. Air Force, at Council on Foreign Relations, New York City, April 28.

Maj. Gen. B. I. Funk, Commander, Space Systems Div. (AFSC), at American Society for Quality Control Meeting, Los Angeles, Calif., May 14; at Aero Club, Buffalo, N. Y., May 20.

Brig. Gen. G. J. McClearnon, Dir., Maintenance & Engineering (AFLC), at Aerospace Electronics Conference, Dayton, Ohio, May 17.

Lt. Gen. T. P. Gerrity, Dep. Chief of Staff (Systems & Logistics), at American Institute of Industrial Engineers Meeting, San Francisco, Calif. May 26–27.

DOD, NASA Sign New Manned Space Flight Cooperation Agreement

The Department of Defense and the National Aeronautics and Space Administration have reached a new agreement for the coordination of their manned space flight programs.

The memorandum of understanding, signed by Defense Secretary Robert S. McNamara and NASA Administrator James E. Webb, supersedes the Jan. 21, 1963, agreement between the two agencies concerning the Gemini program and establishes a joint NASA-DOD Committee known as the Manned Space Flight Policy Committee.

Within guidance provided by the Secretary of Defense and the Administrator of NASA, the committee will determine top level policy concerning the Manned Space Flight Program, insure the coordinated planning of the agencies' programs in this area, and resolve matters concerning the mutual participation in and support of the Manned Space Flight Program which cannot be resolved at a lower level.

Co-Chairmen of the Committee are Ropert G. Seamans, Jr., NASA Deputy Administrator, and Dr. John S. Foster, Jr., Director of Defense Research and Engineering.

Other members are: Daniel J. Fink, Deputy Director, Defense Research and Engineering (Strategic and Space Systems); Dr. Alexander H. Flax, Assistant Secretary of the Air Force (R&D); Dr. George E. Mueller, NASA Associate Administrator for Manned Space Flight; and Dr. Homer E. Newell, NASA Associate Administrator for Space Science and Application.

FROM THE SPEAKERS ROSTRUM

Address by the Honorable Robert N. Anthony, Asst. Secretary of Defense (Comptroller), at the DOD Advanced Planning Briefings for Industry, Boston, Mass., March 3, 1966.

Hon. Robert N. Anthony

Resource Management Systems

* * * * * * * * * * * *

First of all, what do we mean by Resource Management Systems? Nothing very exotic, nothing very mysterious. The word "resource" in this context means labor, materials and services. Looked at as resources, labor, materials and services can most easily be described and measured in dollar terms and, therefore, the common denominator used in our Resource Management Systems is usually monetary. In broadest terms, we mean by Resource Management Systems all the systems that aid DOD management in their task of assuring that resources are obtained and used both effectively and efficiently in the accomplishment of DOD objectives. That is a pretty theoretical definition. The term may become more meaningful if I list the principal types of systems that are included within it. These are:

- Programming and budgeting, which is the process of deciding on our goals and the resources we need to reach these goals, and of justifying these needs to the Congress.
- The management of resources for operating activities, that is the combat forces and the associated support and command establishment that make up the Department.
- The management of inventory and similar assets, which is the process of controlling the millions of items that flow through our supply system.
- The management of the acquisition, utilization and disposition of capital assets, which is the process of getting the weapon and support systems of the quality and configuration we need, on schedule, and at lowest cost.

Incidentally, I don't want to leave the impression that the systems do the managing of these functions. Quite the contrary. Managers—human beings—do the managing, of course, and the systems are no more than collections of procedures, forms and reports that help the managers do their job. Or, at least, they are intended to help managers do their job. For we must admit the possibility that a system may be nothing more than a paperwork exercise, that is, useful only in that it provides jobs for large numbers of clerks.

Let me now focus on the fourth item—the management of the weapon and support systems acquisition process. As I mentioned earlier, this is the realm of the relationship between you as developer and producer, and the DOD as customer, a relationship that may begin even before a contract has been signed, and that lasts through the completion of the contract. You can call this the DOD-contractor interface, and you can describe and deal with it in at least three different ways, depending on your point of view.

The project manager in the Defense Department sees it as the problem of extracting from contractors the information that he believes he needs to keep track of progress, and also the information he might possibly need to answer as yet undefined questions of program sponsors, budget analysts and his superiors. The project manager wants data tailor made to his individual specifications—general enough to be understandable, and detailed enough to keep him out of trouble when questions are asked by someone up the line. And, of course, he wants the data to have the virtues of accuracy, timeliness, auditability and zero cost. Simple enough and fair enough—from his point of view.

I don't need to tell this audience how the contractor sees the problem. It might be an exaggeration to say that he would prefer unlimited funding, an indefinite amount of time and no status reporting during the period between the signing of the contract and delivery of product and bill. But not too much of an exaggeration.

The top managers in DOD—the Secretary of Defense, his principal assistants, the senior officials of the Military Departments and Defense agencies—have a different and perhaps broader concern. They must live with the obvious disparities between the points of view of the Defense project manager and the contractor but, more importantly, they must represent the public interest. No matter how good the collateral for disengagement, the top management of DOD is never relieved of its responsibility to guard national security and be a wise steward of public resources.

During the last decade, the Military Departments have developed and produced a wide variety of weapon and support systems, and they have also designed a wide variety of management systems for dealing with these major acquisitions. Each manager has separately wrestled with the problem of devising a system for describing plans, for measuring and controlling progress against those plans, and for recording experience so that the estimating and management job could be done better the next time. The result has been a proliferation of systems, reports and acronyms.

The names of these systems are familiar to most of you: PERT Time, PERT Cost, Critical Path Method, PROMPT, IMIS, Line of Balance, Earned Value Reporting, PEMARS and CEIS—to name just a few.

Here again it will be helpful to do some classifying within this collection of systems that we have labelled Acquisition Information and Management

Systems. In one category are the procedures that have been developed to collect historical cost data, broken down in various ways, that help DOD people make better estimates and negotiate more knowledgeably, on the basis of experience. In a second category are all the various methods that have been developed by DOD project managers for measuring progress against development and production plans, usually in terms of cost, schedule and technical configuration and characteristics.

We will label the first group, Cost Information Reports, and the second, Performance Measurement Systems. In both these areas, growth has been prolific. Fertile imaginations and active ingenuity have produced many varieties of procedures and forms. Common sense suggests strongly that the Defense Department and industry would both benefit from a concerted effort to achieve balance, compatibility, simplicity, and an adequate measure of uniformity among the multitude of management systems and subsystems already in existence or under preparation within DOD. Such an effort is under way. It is governed by a few basic precepts that I should like to list for you:

- Standardize and control DOD data demands on contractors and in-house facilities. The intent, pure and simple, is to reduce markedly the volume, variety and number of management-type reports which DOD demands of you.
- Minimize pressures to change effective contractor management accounting systems, but insure that data are credible and timely.
- Recognize that needs for data differ at various management levels. In particular, limit the flow of data to top Defense management to that needed for the carrying out of top management responsibilities.
- Leave room for innovation and progress and, hence, minimize the mandatory features.
- Recognize the paramount interest of the first-line manager, i.e., the project manager.

To focus this work of improving acquisition management systems, I have set up an office of Assets Management Systems. Currently this office has men who represent all major elements of the DOD. These men are hard at work to identify acquisition management data requirements at all levels, and to inventory and describe all existing information and management systems in order to determine areas of similarity and peculiarity among the respective Service efforts.

Now—where do we stand with respect to the cost collection systems? An early effort at standardization was called CEIS (Cost and Economic Information System). The motivation to develop CEIS came from the recognition we in DOD had to have the raw material that would help us make valid, independent cost estimates on major weapon systems. CEIS moved through the development process for nearly two years. This deliberate rate of progress was attributable not to any decrease in the degree of urgency and certainly not to lack of effort on the part of the developers, but rather to successive discoveries concerning the nature of the problem. It was something akin to peeling an artichoke (or an onion). There was layer after layer beneath the surface.

Two years of development, review, comment and accommodation have changed the original creature, CEIS, to the point where we decided to recognize the metamorphosis with a new name, CIR (Cost Information Reports). And today, after two major industry reviews, CIR is well on the road to implementation.

As reported in the Jan. 1 issue of *Business Week*, representatives of industry were given an almost unprecedented opportunity to review preliminary drafts of CEIS and CIR and to recommend modifications. What is more important, most of the recommended modifications have been incorporated in the latest version of the system. We are grateful for them. They have made the CIR more workable for industry without sacrificing the data needed by Defense analysts. This dialogue has produced what we think is a workable, rather than an arbitrary or visionary, program.

Thus, what began as another independent approach to part of the acquisition process is evolving into a system which attempts to recognize all aspects of the problem, gives careful attention to balance and integration among all associated subsystems and eliminates duplication and overlaps.

I do not believe it is necessary to recite the history of the DOD attempts to grapple with the problem of estimating the cost of weapon and support systems. Two important realities dominate this problem. We must utilize the products of our nation's technological advancement; yet we are constrained by limited resources. These conditions impose not only the imperative to choose from among alternatives, but also the necessity to engage in tough-minded procurement. If we are to do our proper job in contract negotiation, we must have the capability to estimate costs independent of those proposed by our suppliers. I am not saying that our estimates will always be more accurate. I am saying that a cost estimate arrived at through the process of a dialogue between an informed seller and an informed buyer will be more mutually satisfactory than a cost estimate arrived at unilaterally by one party to the negotiation. We, too, have a Board of Directors — the Congress — whom we must be able to satisfy.

We propose to obtain this capability to derive independent cost estimates by aggregating the actual costs of weapon and support systems in useful arrays and then, following a variety of widely accepted statistical procedures, extrapolating from such a data bank the potential costs of follow-on systems. Incidentally, although some people argue that the differences between successive generations in weapon and support systems families make such an approach infeasible, the fact is that we already have enough experience to know that it will work.

CIR has had the advantage of intensive scrutiny by various representatives of industry. What began as a proposal to gather information on almost every type of large procurement in the most extensive detail and in a rigidly prescribed format has been significantly modified. It now applies only to aircraft, missile and space systems; requires detail at a high level of summarization; and, with the one exception of the work breakdown structure element called airframe, permits wide latitude in report composition. I might insert here that we in the Comptroller's office and the people in the Office of the Director of Defense Research and Engineering are working together to insure that the work breakdown structure means and looks the same for Cost Information Reporting as it does for Configuration Management.

Unless there are very special circumstances that make it imperative, CIR will not be applied retroactively. And what about subcontractors? In aircraft, missile and space programs certain major subcontractors will be required by DOD to submit their own, separate Cost Information Reports, either directly to DOD or via the prime contractor, depending on the agreement between the prime and the subcontractor. Generally these will be subcontractors in the over-$50 million category. Costs of all other subcontractors will be summarized by the prime, and no separate reporting will be required by DOD.

CIR is composed of five forms:

- A contract cost data report, summarizing total costs to date on a contract, by work breakdown structure element, will cover all activities included in a contract or proposal.
- A functional cost-hour report may be used to collect additional cost support for certain of these elements.
- A progress curve report, also optional and also employed selectively, will provide the unit or average unit cost (dollars and manhours) of the unit or lot accepted during the reporting period.
- A fiscal year data report, summarizing program estimates by fiscal year for relevant work breakdown structure elements may be requested.
- Similarly, a fiscal year functional cost-hour report may be required with separate reports prepared for recurring and nonrecurring costs.

CIR is currently being processed through the Bureau of the Budget. Where applicable, it replaces other forms such as the DCPR series and the DD 1177. The Military Departments are staffing for its implementation, and we expect that it will be in operation on selected new contracts before the end of June.

Four of the five reports mentioned above are both optional and selective. You may be dubious about our willingness to exercise such optionality or selectivity with restraint. In order to insure that this is in fact done, we are setting up a new mechanism that requires the data that a project manager proposes to collect be screened and approved in advance by a high level review group. Under this procedure, the cost data requirements to be incorporated within a given contract, or series of contracts, for a given weapon or support system will be submitted by the appropriate Military Department to the Office of the Secretary of Defense for review. During this review, the proposed cost data requirements will be examined for adherence to standards and appropriateness of degree of detail specified. Any additional or unique data requirements will have to be completely justified before approval will be granted. This procedure is designed as an insurance policy against undesirable proliferation. If successful, it may be extended to cover not only cost data, but other kinds of nontechnical data.

In recent years, representatives of industry have viewed with alarm what they believed to be a trend on the part of DOD toward a requirement for a single standard accounting system for industry. I can say categorically that we have no such intention. We believe it is far better to make full use of existing effective contractor management accounting systems, each designed to meet the contractor's own needs, then to dream up a standardized strait jacket that, however well intentioned, would probably meet no one's needs. There are many different ways of putting together effective management systems, and they need not be exactly similar.

There is, however, a need to define what we mean by effective management accounting. Here we are looking for three principal characteristics:

- Costs are charged as incurred; that is, when, and only when, work is performed. For example, a material cost is charged to an account not when a purchase order is cut, but when resources are actually applied.
- Every reasonable effort is made to segregate from a general overhead account those items that can be considered directly attributable overhead and is thus directly chargeable.
- The system is completely auditable from the entry on the report directly back to the accounting system.

The detail needed by the project manager is obviously not required at the OSD level. The forms will permit progressively higher summarizations of data. The principal vehicle for this will be an integrated work breakdown structure. The idea of focussing managerial attention to component elements of a weapon or support system has been with us for some time. A specific work breakdown structure for a family of weapon systems is still subject to problems of definition, but it is understood well enough by most participants in the weapons acquisition process to permit its general application in management control. What is important is that now all components of DOD will employ a similar approach to the creation of work breakdown structures. The existence of such a structure, which is simply a hierarchy or pyramid of the elements which make up a weapon or support system, will allow the assembly of data at any level of detail desired. It will be the framework upon which the management information will hang.

Secretary McNamara often recalls the two general instructions given him by President Kennedy in January, 1961. These were in essence:

- Develop the military force structure necessary to support our policy.
- Procure and operate this force at the lowest possible cost.

These twin mandates still stand and demand that we exercise a degree of management attention which does not exist in other parts of the market place. We simply assert that this dual responsibility can best be satisfied when DOD and industry work together in understanding. I think a good example of how such cooperation can work in practice is to be found in the evolution of CIR.

Finally, some words about the work we are doing, in cooperation with the staff of the Assistant Secretary of Defense (Installations and Logistics), to simplify and standardize performance measurement systems which DOD project managers impose on contractors and in-house activities alike. One survey that I looked at recently found 58 or more different (or at least differently named) systems in use where there was an interface of DOD project managers and weapon system contractors. That's too many. Stating and agreeing on plans for phased progress of development and production, in terms of milestones, dollars and technical accomplishment, and then measuring progress against such plans just cannot be such a variable task that 58 or more procedures, reports and information systems are needed for it. Right now we are listing and analyzing these numerous systems, and hope very soon to find in them the useful least common denominator which will meet the needs of DOD management as a whole. Having done this, we hope to develop standard contractual language on performance measurement which does not specify procedural detail, but does spell out criteria and general characteristics.

Without changing effective management control systems used by contractors in running their business, we want simply to spell out the characteristics of a data converter which will make the track from performance to summary reports both reliable and useful. You will hear more about our work in this field of performance measurement systems as this year goes on. Among other things, we expect to relate this performance measurement effort to Contractor Performance Evaluation in a meaningful way. The target for completing the performance measurement effort is December of this year.

I have thus attempted to explain the particular and peculiar requirements of the DOD which make necessary the creation and imposition of broad management systems. Systems such as I have described potentially affect all of you, and the question can legitimately be asked—what's in it for me?

All industry, but most particularly, small and medium-sized business, should benefit from the consolidation of many diverse performance measurement systems into a single coordinated approach.

The cost data banks, from which certain kinds of non-proprietary data will eventually be made available to industry, should provide a rich source of information.

The practice of close coordination with industry during systems development, and the policy of providing reasonably lengthy periods for industry review will be continued, and should produce workable results.

The policy of utilizing, rather than changing, effective industrial accounting systems should reduce any fears that the DOD will ultimately insist upon a standard accounting system.

Finally, the institution of the data plan review process at the OSD level should go a long way toward preventing the imposition of excessive or inappropriate data requirements on contractors.

While the DOD maintains its need to know and to manage, it continually attempts to recognize and alleviate the problems of industry.

A great deal of thought and effort is being devoted to the development of these systems, to make them responsive and useful, but not uselessly burdensome.

In this continuing effort to manage the interface between Government and industry, all of us as citizens need the benefit of all the accumulated wisdom and experience of both sides. We need from industry not only response and reaction, but affirmation and constructive ingenuity in devising new ways to improve this interface. For it is both enlightened self-interest and practical patriotism for all of us to join in seeing to it that Defense dollars do their full duty for our country.

Trends in AF R&D

(*Continued from Page* 16)

knowledge and "building blocks" to develop a proper defense against it.

The Manned Orbiting Laboratory (MOL) program, for which the Air Force received the go-ahead last year, will contribute greatly to our knowledge of man's usefulness in space. It is not an aggressive program because it poses no military threat to anyone. In fact, all our space programs are peaceful, either in helping to maintain peace or in providing peaceful benefits. But cooperating with the National Aeronautics and Space Administration, the Air Force must provide its share to the mounting store of space knowledge and experience. I am confident that, as a result, we will be better prepared to deal with any military threat from or in space that may arise in the future.

In conclusion, I want to make a comment about the role of research in contributing to our technological superiority. The term "research and development" has almost become one word, with the emphasis on development. Yet, most of the technological advances that are reflected in our weapon systems today had their start in some research laboratory.

We in the Air Force recognize the many independent contributions American industry has made through its research activities, and I encourage your continued efforts in striving for advances in technology which have potential military applications. To the civilian and military scientists of the Air Force as well as to their colleagues in science and industry, to whom we owe these advances, I want to hold out a challenge.

Let us strive not merely for continuing advances in the state of the art but for technological breakthroughs so great that they become, in effect, "technological leaps." Such a leap was represented by the development of the atomic bomb which, to this day, has assured our nuclear superiority and thereby prevented general war. What would this world be like if the atomic bomb had first been developed by the Soviets?

I mentioned the danger of technological surprise. Let us be the ones who surprise our enemies with technological leaps so far-reaching that they would insure our superiority for years to come. That would be the greatest contribution which research *and* development could make to the cause of lasting peace with honor.

Army to Buy New Huey Cobra Helo

The U. S. Army plans to purchase an improved armed helicopter to replace the armed UH–1B now in use.

The new armed helicopter (Huey Cobra) will have greater range, speed and weapons payload. It incorporates the same transmission, engine and rotor system as the UH–1B in a new streamlined fuselage to gain greater performance and maneuverability.

Selection of the interim armed helicopter was the result of a need for an improved weapons helicopter which could be supplied quickly, at low cost and with the least impact on the Army's supply and training base. It will serve as the Army's armed helicopter until the Advanced Aerial Fire Support System is available.

First deliveries of the helicopter, which is built by Bell Helicopter Co., Fort Worth, Tex., are expected by mid-1967. Deployment will take place as soon thereafter as possible.

Missions for the new helicopter will be the same as its predecessors—to escort troop-carrying helicopters and provide suppressive fire in the landing zones to support airmobile operations.

The modified helicopter can be deployed directly from the production line to field units without the need for retraining pilots and mechanics. In addition, maximum use of on-site spare parts will be possible.

U.S. Marine Corps Advanced Procurement Information Available

The U.S. Marine Corps has completed procurement planning for three fiscal years for such items as generator sets, special communications central, radio set, tractor and fuel ferrying assembly. The total dollar value of these procurements is on the order of $130 million.

Complete information is available from Mr. J. W. McLain, Director, Procurement Division, Code CSG, Headquarters, U.S. Marine Corps, Room 4000, Arlington Annex, Washington, D.C. 20380, phone (Area Code 202) OXford 4-2582. Mr. McLain will be a counselor at the DOD/National Security Industrial Association Advance Planning Briefing for Industry, at the Sheraton-Park Hotel, Washington, D.C., April 27-28.

MEETINGS AND SYMPOSIA

MAY

Fifth **Turbine Engine Lubrication** Conference. May 23-25, at the Granada Hotel, San Antonio, Tex. Co-sponsors: Air Force Aero Propulsion Laboratory, Research and Technology Div. (AFSC), and Southwest Research Institute. Contact: G. A. Beane, Air Force Aero Propulsion Laboratory, Wright-Patterson AFB, Ohio, (Area Code 513) 253-7111.

JUNE

Electromagnetic Windows Symposium, June 1-3, at the Georgia Institute of Technology, Atlanta, Ga. Sponsor: Air Force Avionics Laboratory. Contact: R. Ireland (AVWE-3), Air Force Avionics Laboratory, Wright-Patterson AFB, Ohio 45433, (Area Code 513) 253-7111, ext. 55720.

Fifth U.S. National Congress of **Applied Mechanics**, June 14-16, at the University of Minnesota, Minneapolis, Minn. Sponsors: Air Force Office of Scientific Research, Office of Naval Research, Army Research Office, American Physical Society, American Society of Mechanical Engineers for Experimental Stress Analysis, American Institute of Aeronautics and Astronautics, American Mathematical Society, Society for Rheology and American Society for Testing and Materials. Contact: Maj. Lawrence P. Monahan, Jr., Army Research Office-Durham, Box CM, Duke Station, Durham, N.C. 27706, (Area Code 919) 286-2285.

International Conference on **Crystal Growth**, June 20-24, in Boston, Mass. Sponsor: Air Force Cambridge Research Laboratories. Contact: Charles S. Sahagian (CRWPC), Air Force Cambridge Research Laboratories, L. G. Hanscom Field, Bedford, Mass. 01731, (Area Code 617) CR 4-6100, ext. 3298.

Low Speed Aerodynamic Problems Associated with Helicopters and V/STOL Aircraft, June 22-24, in Buffalo, N.Y. Co-sponsors: Army Aviation Materiel Laboratories and Cornell Aeronautical Laboratory, Inc. Contact: John E. Yeates, Army Aviation Materiel Laboratories, Fort Eustis, Va. 23604, (Area Code 703) 878-4101.

Second Rochester Conference on **Coherence and Quantum Optics**, June 22-24, at University of Rochester, Rochester, N.Y. Co-sponsors: Air Force Office of Scientific Research and Air Force Cambridge Research Laboratories. Contact: Dr. M. C. Harrington (SRPP), Air Force Office of Scientific Research, Tempo D, 4th St. and Independence Ave. SW, Washington, D.C. 20333, (Area Code 202) OXford 6-4464.

Cold Spring Harbor Symposium on **Quantitative Biology**, dates undetermined, in Cold Spring Harbor, N.Y. Sponsors: Cold Spring Laboratory for Quantitative Biology, Air Force Office of Scientific Research, National Institute of Health, National Science Foundation and Atomic Energy Commission. Contact: Dr. R. V. Brown (SRLA), Air Force Office of Scientific Research, Tempo D, 4th St. and Independence Ave., SW, Washington, D.C. 20333, (Area Code 202) OXford 6-4181.

JULY

Solid Propulsion Conference, week of July 18, in Washington, D.C. Co-sponsors: Interagency Chemical Rocket Propulsion Group and American Institute of Aeronautics and Astronautics. Contact: P. J. Martin, Chemical-Propulsion Information Agency, 8621 Georgia Ave., Silver Spring, Md. 20910, (Area Code 301) 589-7700, ext. 560.

AUGUST

Eleventh International Symposium on **Combustion**, Aug. 14-20, at the University of California, Berkeley, Calif. Co-sponsors: Ballistic Research Laboratory and the Combustion Institute of Pittsburgh, Pa. Contact: Dr. R. J. Heaston, Physical Sciences Div., Army Research Office, 3045 Columbia Pike, Arlington, Va., (Area Code 202) OXford 4-3465.

Unguided Rocket Ballistics, Aug. 30-Sept. 1, at Texas Western College, El Paso, Tex. Sponsor: Army Electronics Research and Development Agency. Contact: V. C. Cochran, Army Electronics Research and Development Agency, White Sands Missile Range, N.M. 88002.

Logic, Computability and Automata, date and place undetermined. Co-sponsors: Hughes Aircraft Co. and the Rome Air Development Center. Contact: C. A. Constantino (EMID), Rome Air Development Center, Griffiss AFB, N.Y. 13440.

Ocean Electronics Symposium, Honolulu, Hawaii, Aug. 29-31. Sponsor: Hawaii Section, Institute of Electrical and Electronics Engineers (IEEE). Contact: Robert R. Hill, Chairman, IEEE Ocean Electronics Symposium Headquarters, 1441 Kapiolani Blvd., Suite 1320, Honolulu, Hawaii, 96814.

USAF Avionics Lab Plans Classified Briefing

The Air Force Avionics Laboratory is planning a classified briefing for industry to be presented in a series of regional meetings. The objective is to expand upon the Technical Objective Document (TOD) Release Program and provide to industry more complete detail on the exploratory development programs of the laboratory during the next two years. The briefing is classified Secret.

Presentations to be made at the briefing will be on:

- Mission, organization, personnel, funds and physical plant of the Air Force Avionics Laboratory.
- Definitions and interrelations of DOD program elements; technical domains of the Air Force Systems Command's Research and Technology Division (RTD); and Technical Objective Documents.
- Recent achievements, existing programs and planned program for next two years on each of the following TOD's:

RTD 67–5, Avionic Communication.

RTD 67–6, Bionics, Lasers and Molecular Electronics.

RTD 67–13, Transmission and Reception Above 15 GH's.

RTD 67–15, Electromagnetic Vehicle Environment.

RTD 67–16, Electromagnetic Warfare.

RTD 67–27, Navigation, Guidance and Defense.

RTD 67–28, Photo Materials and Optronics.

RTD 67–29, Position and Motion Sensing.

RTD 67–34, Reconnaissance.

Locations and dates of the meetings are:

- Dayton Ohio, May 19, 1966.
- Los Angeles, Calif., Aug. 27, 1966.
- Washington, D.C., Sept. 1966 (exact date not yet determined).

Names and mailing addresses of individuals from industry and research organizations desiring to attend the various regional meetings should be furnished to:

Hq., Research and Technology Div.
Attn: Mr. Ted Patterson (RTS)
Air Force Systems Command
Bolling Air Force Base
Washington, D. C. 20332

CALENDAR OF EVENTS

April 28: Property Administration Assn. Annual Seminar, Hotel New Yorker, New York City.

May 1-4: American Institute of Chemical Engineers Meeting, Columbus, Ohio.

May 5: American Ordnance Assn. Annual Meeting, Washington-Hilton Hotel, Washington, D.C.

May 10-12: National Telemetering Conference, Boston, Mass.

May 11: National Aerospace Services Assn. Annual Meeting, Washington, D.C.

May 11-13: American Helicopter Society Meeting, Sheraton Park Hotel, Washington, D.C.

May 16-18: National Aerospace Electronics Conference, Dayton, Ohio.

May 16-20: American Society of Civil Engineers Meeting, Denver, Colo.

May 17-19: National Security Industrial Assn./Navy Anti-Submarine Warfare Innerspace Conference, Washington, D.C.

May 19-20: Southern Research Institute "Membrane Processes for Industry" Symposium, Birmingham, Ala.

May 21: Armed Forces Day.

May 31-June 2: American Society for Quality Control Meeting, New York City.

June 2-4: American Society for Metals/Eastern Regional Exhibition and Conference, Boston, Mass.

June 6-10: Society of Automotive Engineers Convention, Detroit, Mich.

June 6-10: Society of Plastic Industries Convention, New York City.

June 7-9: Armed Forces Communications & Electronics Assn. Convention, Sheraton-Park Hotel, Washington, D.C.

June 12-15: American Society for Mechanical Engineers Meeting, Philadelphia, Pa.

June 19-23: Assn. of Industrial Advertisers Meeting, New York City.

June 19-24: Communication Workers of America Meeting, St. Louis, Mo.

June 20-23: American Nuclear Society Meeting, Denver, Colo.

June 21-24: Data Processing Management Assn. Meeting, Chicago, Ill.

Operational Symposium Will Be Highlight of AHS Forum

An Operational/Mangement Symposium will be one of the highlights during the American Helicopter Society Forum, May 11–13, at the Sheraton Park Hotel, Washington, D.C.

The symposium discussions by industry and military officials will cover topics on tactical retrieval of aircraft and personnel, human factors, cost effectiveness and combat effectiveness in procurement decisions, VTOL on the moon and program management concepts—industry and military practices. Its objective is to provide for updating attendees and an exchange of ideas and experience between the DOD and industry.

For further information contact Mr. Edward W. Goshorn, Suite 1200, 1625 K Street NW, Washington, D.C. 20006, (Area Code 202) 737–2367.

Army To Organize Chaparral/Vulcan Air Defense Battalions

The Army plans to organize new air defense battalions armed with the Chaparral guided missile and the Vulcan automatic gun to meet the needs of field commanders for low altitude air defense in forward battle areas.

Each new battalion of 755 men will have two Chaparral and two Vulcan firing batteries.

The Chaparral is mounted on an M–548 self-propelled vehicle. Its long range will be complemented by the quick reaction and extremely low altitude capability of the M–61A 20mm Vulcan automatic gun which will also be vehicle mounted.

Field Army air defense is now provided by the Nike Hercules, a medium and high altitude guided missile, and the Hawk, a medium and low altitude missile. The new battalions will fill in the low level defense, and complement the hand-held Redeye missile now entering the Army's inventory.

Additional air defense support for the field will come when 40mm gun (Duster) battalions and quad-50 batteries are activated.

Modification of C–123 Aircraft Initiated by AFLC

A two-year program for the installation of auxiliary jet engines on piston-powered C–123B transport aircraft has been initiated by the Air Force Logistics Command, Wright-Patterson AFB, Ohio.

The program calls for installation of auxiliary jet engines alongside the C–123's two reciprocating engines. It also includes a modulated anti-skid brake system, with new wheels and brakes, and a new stall warning system.

One hundred and twenty aircraft will be involved in the modification project. Delivery of the first modified aircraft is scheduled for November and completion of the project is expected by December 1967.

Fairchild-Hiller Corp., of Hagerstown, Md., has received initial Air Force funding of $2.6 million for the project. The contract was awarded by the Warner-Robins Air Materiel Area, Robins AFB, Ga., system support manager for the C–123.

Marine Corps Activating New Division at Camp Pendleton

The U. S. Marine Corps began activation of a new division March 1, with the formation of the first regimental unit of the new group at Camp Pendleton, Calif. The new division, designated the Fifth, brings the Marine Corps strength up to four divisions.

Regimental Landing Team 26, consisting of the 26th Marine Regiment, and supporting elements, was the first unit of the new division to become active. Two more regiments, the 27th and 28th, will be formed before the end of the year. An artillery regiment, designated the 13th Marines, will also be added.

The division is expected to be fully manned within a year. Headquarters and major portions of the division will be located at Camp Pendleton. One battalion landing team, plus aviation elements, will be based at Kaneohe Bal, Hawaii.

Since the activation of the division is scheduled in increments, some battalion landing teams will reach full operational readiness by the time the entire division is formed.

NOTES FOR EDITORS

Briefed below are some events and projects within the Department of Defense which may be of interest to writers and editors. If further information on any of these topics is desired, please write to Chief, Magazine and Book Branch, Office of Assistant Secretary of Defense (Public Affairs), Washington, D.C., 20301.

"MAN AMPLIFIER" TO AUGMENT HUMAN STRENGTH AND ENDURANCE

The U.S. Navy is developing a unique exoskelton suit which can be worn like an outer garment to augment a person's ability to lift and move heavy objects.

The suit, which contains its own power supply, is a jointed, load bearing framework which enables the wearer to perform tasks beyond his normal ability or which would demand prolonged exertion.

With the aid of the exoskelton suit, a man will be able to lift as much as 1,500 pounds to a height of six feet and be able to carry the load at least 25 feet in about 10 seconds.

Enough joints will be included in the suit to allow the wearer to walk, bend, turn, lift, climb, push and pull with ease. The "gloves" of the suit will be flexible enough to permit the man to climb ladders, grip handles and ropes and handle objects of different sizes and shapes.

The final product will be used for such tasks as handling armament in confined shipboard quarters and for moving heavy cargo that now requires special mechanical equipment. Further refinement of the suit is planned to permit its use in deep sea salvage and search-and-rescue missions.

NEW ARMY CRAFT ZIPS THROUGH SWAMPS

A shallow draft boat capable of carrying 12 men or 2,000 pounds of supplies 30 MPH through swamps and weed-infested waters is being developed by the U.S. Army Engineer Research & Development Laboratories, Fort Belvoir, Va.

The boat is powered by a 400-horsepower aircraft engine with a specially designed four-blade propeller and can be steered like a motorcycle. Capable of traveling 40 MPH in open water, the craft will be used to provide infantry troops with mobility on water and in swampy areas.

ARMED FORCES DAY TO BE OBSERVED MAY 21

The seventeenth annual Armed Forces Day will be observed May 21 as the nation pauses to honor the men of the Army, Navy, Air Force, Marine Corps and Coast Guard.

Because of the significance of the holiday and since so many people are connected, either directly or indirectly (through active duty, the reserves or defense industry) with the Armed Services, many editors may be interested in obtaining information to commemorate this day in their publications.

When requesting information and photographs from the Magazine and Book Branch for your Armed Forces Day layout, please outline your needs as specifically as possible so that requests can be filled promptly and accurately.

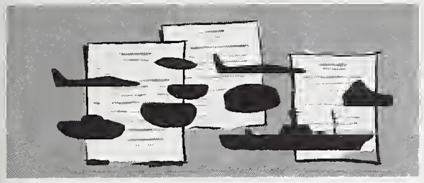
ARMY DEVELOPS COMPUTERIZED MECHANIC FOR WHEELED VEHICLES

The U.S. Army has developed a new automatic diagnostic system called "Readymaids" which is capable of determining the cause of malfunctions of certain types of wheeled vehicles in less than five minutes.

Transportable in a jeep, the computerized "mechanic" detects the fault, types out in English a description of the cause, then lists the parts required by number and repair manual reference.

The diagnostic cycle is started by giving the computer basic information such as vehicle type and engine serial number. If the imput includes mismatched information, the data is returned for correction. The typed data serves as permanent log for vehicle maintenance.

The Army's new shallow draft "swamp buggy" plows through weed-infested waters during recent tests in the Florida Everglades. The new boat will be used to increase the mobility of infantrymen in swampy areas.



DEFENSE PROCUREMENT

Contracts of $1,000,000 and over awarded during the month of March 1966:

DEFENSE SUPPLY AGENCY

3—**American Finishing Co.**, Memphis, Tenn. $4,072,509. 4,240,006 yards of cotton duck cloth. Memphis. Defense Personnel Support Center, Philadelphia.

—**J. P. Stevens & Co.**, New York City. $1,156,590. 1,184,872 yards of cotton duck cloth. New York City. Defense Personnel Suport Center, Philadelphia.

—**Mount Vernon Mills**, Baltimore, Md. $2,459,228. 3,115,653 yards of cotton duck cloth. Baltimore. Defense Personnel Support Center, Philadelphia.

—**Prestex, Inc.**, New York City. $3,067,343. 2,786,000 yards of cotton duck cloth. New York City. Defense Personnel Support Center, Philadelphia.

—**B. G. Colton**, Division of Raylon Fabrics, New York City. $1,395,000. 1,012,713 yards of cotton duck cloth. New York City. Defense Personnel Support Center, Philadelphia.

—**Graniteville Co.**, New York City. $2,099,479. 2,300,002 yards of cotton duck cloth. New York City. Defense Personnel Support Center, Philadelphia.

—**West Point-Pepperell, Inc.**, New York City. $3,730,722. 3,465,198 yards of cotton duck cloth. New York City. Defense Personnel Support Center, Philadelphia.

4—**The Defense Fuel Supply Center**, Alexandria, Va. is awarding the following contracts for JP–5 jet fuel:
- **Humble Oil & Refining Co.**, Houston, Tex. $10,097,500. 115,000,000 gals.
- **Socony Mobil Oil Co.**, New York City. $6,299,067. 73,194,240 gals.
- **Sun Oil Co.**, Philadelphia. $5,661,012. 60,480,000 gals.
- **Union Oil Company of California**, Los Angeles. $3,801,854. 36,603,000 gals. $1,533,692. 14,747,040 gals.
- **Gulf Oil Corp.**, New York City. $3,724,836. 42,180,000 gals.
- **Hess Oil & Chemical Corp.**, Perth Amboy, N.J. $1,810,545. 18,345,000 gals.
- **Edgington Oil Refineries, Inc.**, Long Beach, Calif. $1,324,440. 11,700,000 gals.
- **Tidewater Oil Co.**, Los Angeles. $1,145,000. 10,000,000 gals.
- **Coastal States Petrochemical Co.**, Houston, Tex. $3,389,118. 29,247,000 gals.
- **Cities Service Oil Co.**, New York City. $1,849,860. 20,000,000 gals.
- **Pure Oil Co.**, Palatine, Ill. $1,549,800. 17,010,000.

—**The Defense Personnel Support Center**, Philadelphia, is awarding the following contracts for tropical combat boots:
- **Safety First Shoe Co.**, Nashville, Tenn. $2,760,432. 263,400 pairs.
- **Endicott Johnson Corp.**, Endicott, N.Y. $2,011,200. 160,000 pairs.
- **Bata Shoe Co.**, Belcamp, Md. $1,891,200. 160,000 pairs.
- **Hi-pals Footwear**, Waynesville, N.C. $1,657,350. 145,000 pairs.
- **Randolph Mfg. Co.**, Randolph, Mass. $1,619,455. 126,144 pairs.

—**Delta Petroleum Co.**, New Orleans. $1,940,978. 4,699,435 gallons of lubricating oil. Defense Fuel Supply Center, Alexandria, Va.

—**C. M. London Co.**, New York City. $1,202,361. 2,112,000 yards of polyester cotton broadcloth. New York City. Defense Personnel Support Center, Philadelphia.

7—**Montgomery Pipe & Tube Co.**, Dania, Fla. $4,725,275. 439,152 coils of concertina wire. Dania. Defense Construction Supply Center, Columbus, Ohio.

—**Northwestern Steel & Wire Co.**, Mount Sterling, Ill. $1,630,318. 159,992 coils of concertina wire. Mount Sterling. Defense Construction Supply Center, Columbus, Ohio.

—**Agri-Tec Steel Corp.**, Johnstown, Ohio. $1,523,613. 154,056 coils of concertina wire. Johnstown. Defense Construction Supply Center, Columbus, Ohio.

—**Kings Point Mfg. Co.**, Fayetteville, N.C. $2,906,076. 326,159 poncho liners. Fayetteville. Defense Personnel Support Center, Philadelphia.

9—**U.S. Rubber Co.**, Mishawaka, Ind. $5,778,814. 2,146 sets of nylon runway and taxiway surfacing membrane. Mishawaka. Defense Construction Supply Center, Columbus, Ohio.

—**Reeves Bros.**, New York City. $3,421,324. 1,067 sets of nylon runway and taxiway surfacing membrane. New York City. Defense Construction Supply Center, Columbus, Ohio.

—**Colonial Corp. of America**, Woodbury, Tenn. $1,655,219. 865,248 men's blue chambray shirts. Woodbury. Defense Personnel Support Center, Philadelphia.

10—**Edgington Oil Refineries**, Long Beach, Calif. $1,015,512. 570,000 barrels of No. 6 bunker fuel. Defense Fuel Supply Center, Alexandria, Va.

—**The Defense Fuel Supply Center**, Alexandria, Va., has awarded the following contracts for grade JP–4 jet fuel:
- **Standard Oil Co. of Calif., San Francisco.** $23,524,836. 236,717,284 gals.
- **American Oil Co., Chicago.** $16,151,529. 168,143,000 gals.
- **Humble Oil & Refining Co., Houston, Tex.** $15,697,000. 180,000,000.
- **Union Oil Co. of Calif., Los Angeles.** $14,579,869. 152,806,500 gals.
- **Continental Oil Co., Houston, Tex.** $11,944,132. 133,285,000 gals.
- **Cities Service Oil Co., New York City.** $10,349,543. 120,750,000 gals.
- **Texaco, Inc., New York City.** $9,423,540. 113,400,000 gals.
- **Shamrock Oil & Gas Corp., Amarillo, Tex.** $6,482,500. 64,000,000 gals.
- **Coastal States Petrochemical Co., Houston, Tex.** $4,875,617. 53,227,000 gals.
- **Douglas Oil Co. of Calif., Los Angeles.** $4,820,300. 49,600,00 gals.
- **Sinclair Refining Co., New York City.** $4,677,914. 56,880,000 gals.
- **Signal Oil & Gas Co., Houston, Tex.** $4,051,100. 48,000,000 gals.
- **Standard Oil Co., Cleveland, Ohio.** $3,999,000. 40,000,000 gals.
- **MacMillan Ring-Free Oil Co., Los Angeles.** $3,920,730. 40,000,000 gals.
- **Bell Oil & Gas Co., Tulsa, Okla.** $3,892,125. 46,609,000 gals.
- **Golden Eagle Refining Co., Los Angeles.** $3,864,900. 39,000,000 gals.
- **Delta Refining Co., Memphis, Tenn.** $3,860,595. 39,383,500.
- **Richfield Oil Corp., Los Angeles.** $3,772,062. 37,800,000 gals.
- **Suntide Refining Co., Tulsa, Okla.** $3,741,000. 45,000,000 gals.
- **Phillips Petroleum Co., Bartlesville, Okla.** $3,560,667. 41,580,000 gals.
- **American Petrofina Co. of Tex., Dallas, Tex.** $3,429,340. 37,500,000 gals.
- **Chevron Oil Co., El Paso, Tex.** $3,236,200. 34,000,000 gals.
- **Sunray DX Oil Co., Tulsa, Okla.** $2,876,100. 33,915,000 gals.
- **Howell Refining Co., San Antonio, Tex.** $2,581,923. 27,346,000 gals.
- **Leonard Refineries, Inc., Alma, Mich.** $2,392,590. 24,500,000 gals.
- **Northwestern Refining Co., St. Paul Park, Minn.** $2,244,012. 23,195,000 gals.
- **Triangle Refineries, Houston, Tex.** $2,079,440. 22,000,000 gals.
- **Sioux Oil Co., Newcastle, Wyo.** $1,976,076. 17,100,000 gals.
- **Tesoro Petroleum Corp., Carrizo Springs, Tex.** $1,975,840. 18,500,000 gals.
- **Champlin Petroleum Co., Fort Worth, Tex.** $1,912,200. 20,500,000 gals.
- **Tidewater Oil Co., Los Angeles.** $1,908,900. 18,900,000 gals.
- **Hercules Oil Co., San Diego, Calif.** $1,880,990. 17,855,000 gals.
- **Golden Eagle Refining Co., Los Angeles.** $1,776,400. 18,000,000.
- **Permian Corp., Houston, Tex.** $1,717,425. 17,793,000 gals.
- **Hunt Oil Co., Dallas, Tex.** $1,685,300. 19,000,000 gals.
- **Kerr-McGee Corp., Oklahoma City, Okla.** $1,639,825. 19,545,000 gals.
- **Southland Oil Co., Yazoo City, Miss.** $1,614,165. 16,090,000 gals.
- **Derby Refining Co., Wichita, Kan.** $1,524,750. 18,000,000 gals.
- **Bell Oil & Gas Co., Tulsa, Okla.** $1,112,764. 13,391,000 gals.
- **Mohawk Petroleum Corp., San Francisco.** $1,068,375. 10,500,000 gals.
- **Fletcher Oil Co., Wilmington, Calif.** $1,030,240. 10,500,000 gals.
- **Socony Mobil Oil Co., New York City.** $15,647,818. 173,415,000 gals.
- **Ashland Oil & Refining Co., Ashland, Ky.** $7,522,851. 77,187,000 gals.
- **Debco Corp., Abilene, Tex.** (2) $6,480,602. 67,527,000 gals. $1,720,693. 17,293,000 gals.
- **Crystal Flash Petroleum Corp., Indianapolis, Ind.** $2,139,114. 20,010,000 gals.
- **Monarch Refining Co., San Antonio, Tex.** $1,147,130. 11,850,000 gals.

11—**Orthopedic Equipment Co.**, Bourbon, Ind. $2,386,120. 187,000 folding canvas cots. Bourbon. Defense General Supply Center, Richmond, Va.

—**Sidran Sportswear, Inc.**, Dallas, Tex. $1,225,500. 30,000 men's wool gabardine overcoats. Dallas. Defense Personnel Support Center, Philadelphia.

14—**Borg-Warner Corp.**, Chicago. $2,512,900. 752,880 steel helmets. Chicago. Defense Personnel Support Center, Philadelphia.

15—**Eastman Kodak Co.**, Rochester, N.Y. $1,072,954. 7,300 rolls of aerial photographic film. Rochester. Defense General Supply Center, Richmond, Va.

—**Cavalier Bag Co.**, Lumberton, N.C. $1,705,600. Sand bags. Lumberton. Defense General Supply Center, Richmond, Va.

—**Standard Oil Co. of Calif.**, San Francisco. $1,991,633. 682,000 gallons of automotive gasoline and 15,902,000 gallons of grade DF–A arctic fuel oil. Defense Fuel Supply Center, Alexandria, Va.

—**Tanenbaum Textile Co.**, New York City. $2,440,200. 9,000,000 yards of nylon netting cloth. New York City. Defense Personnel Support Center, Philadelphia.

—**Putnam Mills, Corp.**, New York City. $1,108,090. 3,821,000 yards of nylon netting cloth. New York City. Defense Personnel Support Center, Philadelphia.

16—**Habag Corp.**, New York City. $1,307,561. 12,940,000 pounds of 22-gauge steel sheets. New York City. Defense Industrial Supply Center, Philadelphia.

17—**The Defense Fuel Supply Center**, Alexandria, Va., is awarding the following contracts for diesel and fuel oil:
- **Standard Oil Co. of Calif., San Francisco.** $2,198,000. 1,250,000 barrels of No. 6 fuel oil.
- **Texaco, Inc., New York City.** $1,299,600. 760,000 barrels of No. 6 fuel oil.
- **Gulf Oil Corp., Houston, Tex.** $1,775,189. 300,000 barrels of diesel fuel and 300,000 barrels of No. 6 fuel oil.
- **Socony Mobil Oil Co., New York City.** $1,876,866. 374,000 barrels of diesel fuel and 970,000 barrels of No. 6 fuel oil.
- **Metropolitan Petroleum Co., New York City.** $1,053,800. 160,000 barrels of No. 6 fuel oil and 310,000 barrels of Navy Special.

18—**Brownwood Mfg. Co.**, Brownwood, Tex. $2,583,200. 200,000 men's lightweight raincoats. Brownwood. Defense Personnel Support Center, Philadelphia.

21—**Rubber Fabricators, Inc.**, Grantsville, W. Va. $1,897,500. 250,000 pneumatic mattresses. Grantsville. Defense Personnel Support Center, Philadelphia.

—**Bruce Products, Inc.**, Eatontown, N.J. $1,148,581. 107,848 men's wet-weather parkas. Eatontown. Defense Personnel Support Center, Philadephia.

23—**LaCrosse Garment Mfg. Co.**, LaCrosse, Wis. $3,002,458. 850,864 tent shelter halves. LaCrosse. Defense Personnel Support Center, Philadelphia.

—**Southern Athletic Co.**, Knoxville, Tenn. $1,855,700. 200,000 lightweight men's raincoats. Knoxville. Defense Personnel Support Center, Philadelphia.

24—**B. G. Colton, Division of Raylon Fabrics, Inc.**, New York City. $1,697,990. 1,337,000 yards of wind-resistant cotton oxford cloth. New York City. Defense Personnel Support Center, Philadelphia.

25—**J. P. Stevens & Co.**, New York City. $2,145,000. 500,000 yards of wool serge cloth. New York City. Defense Personnel Support Center, Philadelphia.

29—**U.S. Rubber Co.**, Providence, R.I. $2,738,925. 500-gallon rubber drums. Providence. Defense General Supply Center, Richmond, Va.

30—**Oscar Mayer Co.**, Madison, Wis. $1,087,619. 475,848 cans of prefried sliced bacon. Madison. Defense Personnel Support Center, Philadelphia.

—**Magline, Inc.**, Pinconing, Mich. $4,335,078. 10,457 units of frame sections for maintenance tents. Pinconing. Defense Personnel Support Center, Philadelphia.

—**Flag-Utica Co., Division of Genesco, Inc.**, Florence, Ala., $1,205,506. 425,000 pairs of men's shorts. Florence. Defense Personnel Support Center, Philadelphia.

—**Stone Mfg. Co.**, Columbia, S.C. $1,188,301. 2,838,864 pairs of men's cotton shorts. Columbia. Defense Personnel Support Center, Philadelphia.

—**Nantex Riviera Corp.**, New York City. $1,380,666. 3,219,432 pairs of men's cotton shorts. New York City. Defense Personnel Support Center, Philadelphia.

ARMY

1—**University of Michigan**, Ann Arbor, Mich. $1,299,292. Research work. Hawaii and Ann Arbor. Defense Supply Service, Washington, D.C.

—**Universal Constructors, Inc.**, Albuquerque, N.M. $4,547,000. Work on the Albuquerque, N.M. diversion channel project. Albuquerque. Engineer Dist., Albuquerque, N.M.

—**Eitel McCullough, Inc.**, San Carlos, Calif. $1,143,650. Klystron electron tubes. San Carlos. Army Electronics Command, Fort Monmouth, N.J.

—**Union Carbide Corp.**, New York City. $6,196,213. Components for radio sets. Chemway, N.C. Army Electronics Command, Fort Monmouth, N.J.

—**M. Steinthal & Co.**, New York City. $1268,787. Personnel reserve parachutes. Roxboro, N.C. Army Aviation Materiel Command, St. Louis.

—**Martin Marietta**, Orlando, Fla. $2,000,000. Components for ordnance items. Orlando. Picatinny Arsenal, Dover, N.J.

—**Sperry Rand Corp.**, Salt Lake City, Utah. $1,989,010. Inspection equipment and armament subsystems (M5) for helicopters. Salt Lake City. Army Weapons Command, Rock Island, Ill.

—**Kaiser Jeep Corp.**, Toledo, Ohio. $2,019,085. Utility trucks. Toledo. Army Tank Automotive Center, Warren, Mich.

—**Aerojet General**, Downey, Calif. $1,507,953. Ordnance items. Downey. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Scovill Mfg. Co.**, Waterbury, Conn. $1,434,312. Ordnance items. Waterbury. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Whirlpool Corp.**, Evansville, Ind. $1,870,844. 106mm projectile parts. Evansville. Picatinny Arsenal, Dover, N.J.

—**FMC Corp.**, San Jose, Calif. $1,976,120. Metal parts for 106mm projectiles. San Jose. Picatinny Arsenal, Dover, N.J.

—**Northrop Corp.**, Anaheim, Calif. $2,084,081. 106mm projectile components. Anaheim. Picatinny Arsenal, Dover, N.J.

—**Honeywell, Inc.**, Hopkins, Minn. $3,007,095. Metal parts for grenade assemblies. New Brighton, Minn. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Gar-Let Mfg. Co.**, Philadelphia. $1,579,800. Cable assemblies. Old Forge, Pa. Army Electronics Command, Philadelphia.

2—**Hyde Construction Co.**, Jackson, Miss. $2,920,967. Work on the Okatibee Reservoir. Meridian, Miss. Engineer Dist., Mobile, Ala.

—**SCM Corp.**, Deerfield, Ill. $1,396,030. Teletypewriter sets with ancillary items. Deerfield. Army Electronics Command, Philadelphia.

—**Eureka-Williams Co.**, Bloomington, Ill. $2,196,201. Ordnance items. Bloomington. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**U.S. Time Corp.**, Waterbury, Conn. $4,827,435. Production of ammunition components; provision for new production facilities; and repair, freight, installation and reactivation of government owned production equipment. Waterbury. Ammunition Procurement & Supply Agency, Joliet, Ill.

3—**SCM Corp.**, Deerfield, Ill. $1,410,872. Teletypewriter sets with ancillary items. Deerfield. Army Electronics Command, Philadelphia.

—**Mike Bradford & Co.**, Miami, Fla. $1,385,000. Construction of a special forces complex. Fort Bragg, N.C. Engineer Dist., Savannah, Ga.

—**United Aircraft**, Stratford, Conn. $1,200,000. Long lead time items and components for manufacture and delivery of FY 66 quantity of CH-54A helicopters. Stratford. Army Aviation Materiel Command, St. Louis.

7—**Thiokol Chemical Corp.**, Bristol, Pa. $7,699,089. Ammunition and for operation and maintenance activities at the Long Horn Army Ammunition Plant, Marshall, Tex. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Hoel-Steffen Construction Co.**, Afton, Mo. $1,279,922. Construction work at the Lake City Army Ammunition Plant, Independence, Mo. Engineer Dist., Kansas City, Mo.

8—**Somerset Construction Co.**, Wilmington, N.C. $1,797,447. Work on the Charleston, S.C., Harbor and Shipyard River Project. Engineer Dist., Charleston, S.C.

—**Prestolite Co., Division of Eltra Corp., Toledo, Ohio.** $2,052,550. 25-ampere generators for trucks. Bay City, Mich. Army Tank Automotive Center, Warren, Mich.

—**Fairchild Camera & Instrument Corp.**, Paramus, N.J. $2,000,000. Radio transmitter modulators and other equipment. Paramus. Army Electronics Command, Philadelphia.

9—**FMC Corp.**, Charleston, W. Va. $2,100,000. M113A1 vehicle spare parts. Charleston. Northwest Procurement Agency, Oakland, Calif.

—**Flinchbaugh Products**, Red Lion, Pa. $2,091,653. Metal parts for 90mm projectiles. Red Lion. Ammunition Procurement & Supply Agency, Joliet, Ill.

10—**Galion Amco**, Galion, Ohio. $1,412,400. Metal parts for detonating fuzes. Galion. Frankford Arsenal, Philadelphia.

—**Z.D. Products, Division of Wells Marine**, Inc., El Segundo, Calif. $2,212,000. Production of metal parts for detonating fuzes. El Segundo. Frankford Arsenal, Philadelphia.

—**Bermite Powder Co.**, Saugus, Calif. $5,230,320. Detonating fuzes. Saugus. Frankford Arsenal, Philadelphia.

—**Norfolk Dredging Co.**, Norfolk, Va. $1,856,660. Work on Norfolk Harbor Channel Project. Engineer Dist., Norfolk, Va.

—**American Fabrication Products Co.**, Indianapolis, Ind. $2,048,150. Mortar shell fin assemblies. Indianapolis. Army Procurement Detachment, Chicago.

—**Cone Bros. Construction Co.**, Tampa, Fla. $2,943,512. Work on the Cross Florida Barge Canal Project. Putnam County, Florida. Engineer Dist., Jacksonville, Fla.

11—**Ingraham Co.**, Bristol, Conn. $2,980,130. Metal parts for artillery fuzes. Bristol. Ammunition Procurement & Supply Agency, Joliet, Ill.

14—**FMC Corp.**, San Jose, Calif. $1,151,738. Advance production engineering for HAWK launchers. San Jose. Army Tank Automotive Center, Warren, Mich.

—**Magnavox Co.**, Torrance, Calif. $2,369,000. Radio communications sub-system and ancillary items. Torrance. Army Electronics Command, Fort Monmouth, N.J.

—**T. C. Young Construction Co.**, Williamsburg, Ky. $1,860,645. Work on the Grayson Reservoir Project. Grayson, Ky. Engineer Dist., Huntington, W. Va.

—**Wiley & Jackson Co.**, Roanoke, Va. $7,963,385. Work on the Cross Florida Barge Canal Project. Marion County, Fla. Engineer Dist., Jacksonville, Fla.

—**Harvey Aluminum, Inc.**, Torrance, Calif. $1,975,000. 20mm projectiles. Torrance. Frankford Arsenal, Philadelphia.

—**Maxson Electronics Corp.**, Great River, N.Y. $1,349,423. 20mm projectiles. Macon, Ga. Frankford Arsenal, Philadelphia.

15—**Harris & Brooks**, Riverdale, Md. $1,781,105. Work on the Hannibal Lock & Dam, Ohio River, Project. Engineer Dist., Pittsburgh, Pa.

—**Raytheon Co.**, Lexington, Mass. $1,872,138. Engineering services for the self-propelled HAWK system. Andover and Bedford, Mass. Army Mobility Command, Huntsville, Ala.

—**Raytheon Co.**, Lexington, Mass. $4,507,000. Design and development of the HAWK ATBM/HIP (Anti-Tactical Ballistic Missile/Hawk Improvement Program) missile system. Andover and Bedford, Mass. Army Mobility Command, Huntsville, Ala.

—**AVCO Corp.**, Stratford, Conn. $2,599,000. Product improvement services for calendar year 1966 for T–53 engines for UH–1 helicopters. Stratford. Army Aviation Command, St. Louis.

—**AVCO Corp.**, Stratford, Conn. $2,838,843. Product improvement services for calendar year 1966 for T–55 engines for CH–47 helicopters. Stratford. Army Aviation Command, St. Louis.

—**Bell Helicopter Co.**, Division of Bell Aerospace Corp., Fort Worth, Tex. $2,691,761. Transmissions for UH–1 helicopters. Fort Worth. Army Aviation Material Command, St. Louis.

—**Cadillac Gage Co.**, Warren, Mich. $1,675,000. Armored cars. Warren. Army Tank Automotive Center, Warren, Mich.

16—**Microwave Associates, Inc.**, Burlington, Mass. $1,164,450. Electron tubes for AN/PSS–4 radar sets. Burlington. Army Electronics Command, Philadelphia.

—**AVCO Corp.**, Stratford, Conn. $6,480,000. Aircraft engines for the CH–47 aircraft. Stratford. Army Aviation Materiel Command, St. Louis.

—**General Dynamics**, Rochester, N.Y. $13,583,994. Radio sets and mountings. Rochester. Army Electronics Command, Philadelphia.

17—**Elmer G. Wendt, Inc.**, Sacramento, Calif. $1,991,626. Work on the San Joaquin River Flood Control Project. Manteca, Calif. Engineer Dist., Sacramento, Calif.

—**Ford Motors**, Dearborn, Mich. $3,986,754. ¼-ton trucks. Highland Park, Mich. Army Mobility Command, Warren, Mich.

—**Bell Helicopter Co.**, Fort Worth, Tex. $2,300,000. Procurement of UH–1E helicopters. Hurst, Tex. Army Aviation Command, St. Louis.

18—**AVCO Corp.**, Stratford, Conn. $1,194,695. Nozzle and cylinder assemblies for UH–1 helicopters. Stratford. Army Aviation Materiel Command, St. Louis.

—**Chaney & James Construction Co.**, Richardson, Tex. $1,565,399. Work on the Foster Reservoir, Oregon, Project. Sweet Home, Ore. Engineer Dist., Portland, Ore.

—**Lear Siegler, Inc.**, Anaheim, Calif. $4,400,000. Production of classified electronics equipment. Anaheim. Army Electronics Command, Fort Monmouth, N.J.

21—**Chaney & James & Gibralter Construction Co.**, Richardson, Tex. $2,073,161. Construction of a vacuum telescope laboratory. Sacramento Peak, N.M. Engineer Dist., Albuquerque, N.M.

—**Sperry-Utah Co., Sperry-Rand Corp.**, Salt Lake City, Utah. $2,061,610. Sergeant Phase II ground electronics research & development program. Salt Lake City. Army Missile Command, Huntsville, Ala.

22—**General Electric**, West Lynn, Mass. $1,500,000. Production of engines to support the Advanced Aerial Fire Support System. West Lynn. Army Aviation Material Command, St. Louis.

—**AVCO Corp.**, Stratford, Conn. $21,625,000. Production of helicopter engines. Stratford. Army Aviation Material Command, St. Louis.

—**R. M. Well, Co.**, Quanah, Tex. $1,676,990. Conversion of building facilities at Robins AFB, Ga. Engineer Dist., Savannah, Ga.

—**Acushnet Process Co.**, New Bedford, Mass. $1,400,828. Production of Navy Protective masks. New Bedford. Edgewood Arsenal, Md.

23—**Western Contracting Corp.**, Sioux City, Iowa. $17,117,530. Work on the Stockton Reservoir Project. Stockton, Mo. Engineer Dist., Kansas City, Mo.

—**Lockheed Aircraft**, Burbank, Calif. $12,700,000. Engineering development of the Advanced Aerial Fire Support System. Los Angeles, Ventura and Riverside

Counties, Calif. Army Aviation Material Command, St. Louis.

24—**Champion Co.**, Springfield, Ohio. $1,451,070. Shipping and storage containers. Springfield. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Aerojet General Corp.**, Downey, Calif. $2,449,498. Bomb dispenser assemblies. Downey. Ammunition Procurement & Supply Agency, Joliet, Ill.

25—**Prestolite Co., Division of Eltra Corp.**, Toledo, Ohio. $2,227,439. Automotive storage batteries. Reading, Pa., Vincennes, Ind., Oakland, Calif. and East Point, Ga. Army Tank Automotive Center, Warren, Mich.

—**Thurmont Construction Co.**, Thurmont, Md. $1,337,989. Construction of a guided missile maintenance shop and additions to existing structures. Letterkenny Army Depot, Chambersburg, Pa. Engineer Dist., Baltimore, Md.

—**Pioneer Aerodynamic Systems, Inc.**, Manchester, Conn. $1,846,583. Parachute canopies. Columbia, Miss. Army Aviation Materiel Command, St. Louis.

—**Boeing Co.**, Morton, Pa. $6,440,754. Modification of four CH–47A helicopters to an armed and armored configuration. Morton. Army Aviation Materiel Command, St. Louis.

26—**Philco Corp.**, Philadelphia. $1,663,252. Seven technical control communications centers and ancillary items. Philadelphia. Army Electronics Command, Fort Monmouth, N.J.

28—**H. K. Ferguson**, Cleveland, Ohio. $1,834,670. Construction of a water filtration plant at the Holston Army Ammunition Plant, Kingsport, Tenn. Engineer Dist., Mobile, Ala.

—**Morrow County School Dist.**, Lexington, Ore. $1,242,000. Construction of a high school at Bardman, Ore. Engineer Dist., Walla Walla, Wash.

—**Martin Marietta**, Orlando, Fla. $1,525,506. Supplies and services relating to test and evaluation of the SHILLELAGH anti-tank missile system. Orlando. Army Missile Command, Huntsville, Ala.

29—**Collins Radio Co.**, Richardson, Tex. $1,053,000. Work on the Pacific Scatter Communications System. Work will be done at various overseas locations. Army Electronics Command, Washington Procurement Div., Alexandria, Va.

30—**A. Teichert & Sons, Inc.**, Irwindale, Calif. $2,997,402. Work on the San Jose Channel. City of Industry, Calif. Engineer Dist., Los Angeles.

—**Heil Co.**, Milwaukee, Wis. $8,130,881. 5,000-gallon fuel tank semi-trailers and repair parts. Milwaukee. Army Tank Automotive Center, Warren, Mich.

31—**Mack Trucks, Inc.**, Allentown, Pa. $1,536,405. Axle sets for tractor trucks. Hagerstown, Md. and Allentown. Army Tank Automotive Center, Warren, Mich.

—**Caterpillar Tractor Co.**, Peoria, Ill. $3,250,000. Advance production engineering services of trucks resulting in fabrication of 10 pilot models. Peoria. Army Tank Automotive Center, Warren, Mich.

—**International Telephone & Telegraph**, Harrisburg, Pa. $1,063,320. Audiofrequency amplifiers. Harrisburg. Army Electronics Command, Philadelphia.

—**Speciality Electronics Development Corp.**, Glendale, N.Y. $1,575,030. Manual central office telephone system. Southbridge, Mass. Army Electronics Command, Philadelphia.

—**Kaiser Jeep Corp.**, Toledo, Ohio. $34,479,113. Trucks of various body types. Army Mobility Command, Warren, Mich.

—**Weatherhead Co.**, Cleveland, Ohio. $2,670,222. Metal parts for 105mm projectiles for the M60 tank weapons system. Cuyahoga County, Ohio. Ammunition Procurement & Supply Agency, Joliet, Ill.

—**Dravo Corp.**, Bellvue, Wash. $3,041,654. Work on the John Day Lock and Dam Project. Klickitat and Benton Counties, Wash. Engineer Dist., Walla Walla, Wash.

—**Boyertown Auto Body Works, Inc.**, Boyertown, Pa. $1,097,278. Various types of van bodies. Boyertown. Army Tank Automotive Center, Warren, Mich.

—**General Motors**, Indianapolis, Ind. $2,074,380. Power transfer units for transmissions for the SHERIDAN tank vehicle. Indianapolis. Army Tank Automotive Center, Warren, Mich.

—**Philco Corp.**, Newport Beach, Calif. $1,931,010. Six months industrial engineering services on the SHILLELAGH missile system. Newport Beach. Southwest Procurement Agency, Pasadena, Calif.

—**Philco Corp.**, Newport Beach, Calif. $1,302,000. Initial equipment maintenance for the SHILLELAGH missile system. Newport Beach. Army Missile Command, Huntsville, Ala.

—**Philco Corp.**, Newport Beach, Calif. $1,686,775. Acceptance inspection equipment for the SHILLELAGH missile system. Newport Beach. Army Missile Command, Huntsville, Ala.

NAVY

1—**Sante Fe Engineers, Inc.**, Lancaster, Calif. $1,469,702. Construction of an S–11 subassembly building facility at Seal Beach, Calif. Southwest Div., Bureau of Yards & Docks.

—**Atlantic Research Corp.**, Alexandria, Va. $2,204,712. Rocket motors for TERRIER missiles. Gainesville, Va. Bureau of Naval Weapons.

—**Pascoe Steel Corp.**, Pomona, Calif. $2,449,186. Steel pontoons with fittings and accessories. Pomona. Navy Purchasing Office, Los Angeles.

—**Astrophysics Research Corp.**, Los Angeles. $1,070,335. Research of very low frequency propogation. Los Angeles, Norco, and Lucerne Valley, Calif. Navy Purchasing Office, Los Angeles.

—**Admiral Corp.**, Chicago. $1,701,220. Radio sets for Army and Navy training aircraft. Chicago. Navy Purchasing Office, Washington, D.C.

—**Genge Industries**, Glendale, Calif. $1,313,107. Engineering and technical services related to weapons systems projects. Port Hueneme, Calif. Navy Purchasing Office, Los Angeles.

—**Tracor, Inc.**, Austin, Tex. $1,356,000. Studies and analysis of a Navy surface ship sonar system. Austin. Bureau of Ships.

—**United Aircraft**, East Hartford, Conn. $1,572,000. Spare parts for engines for F–111A aircraft. East Hartford. Navy Aviation Supply Office, Philadelphia.

2—**General Dynamics**, Groton, Conn. $64,889,985. Three dock landing ships. Groton. Bureau of Ships.

—**United Aircraft**, East Hartford, Conn. $23,000,000. TF–30–P–3 engines. East Hartford. Bureau of Naval Weapons.

—**Consolidated Diesel Electric Corp.**, Stamford, Conn. $11,057,968. Skid mounted generator sets. Stockton, Calif. and Stamford. U.S. Marine Corp.

—**Magnavox Co.**, Fort Wayne, Ind. $4,281,572. Sonobuoys and related equipment. Fort Wayne. Bureau of Naval Weapons.

3—**AMCO Electric**, San Diego, Calif. $1,011,811. Improvement to utilities pier 8 at the San Diego Naval Station. Southwest Div., Bureau of Yards & Docks.

—**United Aircraft**, East Hartford, Conn. $1,815,736. Parts used to refit engines for F–9F and F–9J aircraft. East Hartford. Navy Aviation Supply Office, Philadelphia.

—**Marquardt Corp.**, Ogden, Utah. $12,105,000. Nozzle and fin assemblies for 2.75 inch rockets. Ogden. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**Farmers Tool & Supply Corp.**, Denver, Colo. $14,283,900. Nozzle and fin assemblies for 2.75 inch rockets. Denver. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**Columbus Milpar Mfg. Co.**, Columbus, Ohio. $5,985,250. Nozzle and fin assemblies for 2.75 inch rockets. Columbus. Navy Ships Part Control Center, Mechanicsburg, Pa.

—**Hoffman Electronics Corp.**, El Monte, Calif. $6,792,250. 2.75 inch rocket nozzle and fin assemblies. El Monte. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**American Electric, Inc.**, Paramount, Calif. $7,801,000. Fins for 2.75 inch rockets. Paramount. Navy Ships Parts Control Center, Mechanicsburg, Pa.

4—**Cotton Construction Corp.**, National City, Calif. $1,459,000. Construction of a recovery parachute range at Naval Air Facility, El Centro, Calif. Southwest Div., Bureau of Yards & Docks.

—**Douglas Aircraft**, Long Beach, Calif. $1,276,636. Ejector racks and bomb hoist adapters. Torrance, Calif. Bureau of Naval Weapons.

—**Hoffman Electronics Corp.**, El Monte, Calif. $1,390,343. Radio navigation test equipment. El Monte. Navy Aviation Supply Office, Philadelphia.

—**FMC Corp.**, Minneapolis, Minn. $1,950,000. Continuation of work on design and development of a 175mm, 60 cal. gun mount. Fridley, Minn. Bureau of Naval Weapons.

—**Lockheed Aircraft**, Sunnyvale, Calif. $26,550,000. Work on POSEIDON missile system. Sunnyvale. Special Projects Office.

—**Sundstrand Corp.**, Rockford, Ill. $10,438,860. Spare assemblies for F–4 aircraft. Rockford. Navy Purchasing Office, Washington, D.C.

7—**Tracor, Inc.**, Austin, Tex. $1,802,944. Engineering and technical services in connection with Navy sonar systems. Washington, D.C. Bureau of Ships.

—**Dow Chemical Co.**, Camden, N.J. $1,999,388. Aluminum extrusions for airfield matting. Madison, Ill. Naval Air Engineering Center, Philadelphia.

—**AVCO Corp.**, Richmond, Ind. $2,102,061. POLARIS missile components. Richmond. Special Projects Office.

8—**L. B. Samford, Inc.**, Miami, Fla. $1,019,700. Relocation of fuel storage at the Naval Station, Key West, Fla. Southeast Div., Bureau of Yards & Docks.

—**Sparton Corp.**, Jackson, Mich. $8,740,999. Production of sonobuoys and related equipment. Jackson. Bureau of Naval Weapons.

—**General Electric**, Santa Barbara, Calif. $1,222,645. Study and development of new ASW data collection and analysis systems. Santa Barbara. Office of Naval Research, Washington, D.C.

—**Kaiser Aluminum & Chemical Sales**, Hale Thorpe, Md. $1,486,560. Aluminum extrusions for airfield matting. Hale Thorpe. Naval Air Engineering Center, Philadelphia.

9—**Douglas Aircraft**, Long Beach, Calif. $2,019,000. TA–4E aircraft. Long Beach. Bureau of Naval Weapons.

—**Amron Corp.**, Waukesha, Wis. $1,632,900. Facilities for the manufacture of 20mm cartridge cases. Waukesha. Bureau of Naval Weapons.

10—**Dayton T. Brown, Inc.**, Long Island, N.Y. $1,839,856. Preproduction and production lot sample testing of armament and safety equipment for the Navy and Air Force. Long Island. Bureau of Naval Weapons.

—**Bermite Powder Co.**, Saugus, Calif. $7,964,348. Mark 125 Mod 4 ignitors used on 2.75 rockets. Saugus. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**De Val Corp.**, Philadelphia. $2,083,566. AERO–46A and 47A weapon loaders. Philadelphia. Navy Purchasing Office, Washington, D.C.

—**United Aircraft, Pratt & Whitney Div.**, East Hartford, Conn. $11,270,400. TP–30–P–3 engines for the Air Force. East Hartford. Bureau of Naval Weapons.

11—**General Electric**, Schenectady, N.Y. $37,853,100. Reactor plant components for nuclear powered ships. Schenectady. Bureau of Ships.

—**Stewart-Warner, Corp.**, Chicago. $1,608,315. Radar sets for A–4E and TA–4E aircraft. Chicago. Navy Aviation Supply Office, Philadelphia.

—**United Aircraft**, East Hartford, Conn. $5,325,840. TF–33–P–7 engines for the Air Force. East Hartford. Bureau of Naval Weapons.

14—**Sperry Rand Corp.**, Great Neck, N.Y. $2,615,271. Ships Inertial Navigation Systems. Great Neck. Bureau of Ships.

—**Goodyear Tire & Rubber Co.**, Akron, Ohio. $1,402,920. Hose and tank-and-chest assemblies for the Amphibious Assault Fuel System. Litchfield Park, Ariz. U.S. Marine Corps.

—**Grumman Aircraft Engineering Corp.**, Bethpage, N.Y. $21,356,000. Production of S–2E aircraft and related equipment. Bethpage. Bureau of Naval Weapons.

15—**Hughes Aircraft**, Fullerton, Calif. $2,838,803. Equipment for shipboard radars. Fullerton. Bureau of Ships.

—**Sperry Rand Corp.**, Univac Div., St. Paul, Minn. $4,908,191. Classified equipment. St. Paul. Bureau of Ships.

—**Sperry Rand Corp.**, Univac Div., St. Paul, Minn. Programming of computers at the Naval Air Development Center. Johnsonville, Pa. Naval Air Development Center, Johnsonville, Pa.

—**Head Construction Co.**, Washington, D.C. $1,221,000. Construction of an addition to the AUTODIN facility at Andrews

AFB, Md. Chesapeake Div., Bureau of Yards & Docks.

—**Johns Hopkins University**, Silver Spring, Md. $7,869,387. Continued research and development work on guided missile systems. Bureau of Naval Weapons.

—**General Dynamics Corp.**, Pomona, Calif. $34,550,000. TERRIER and TARTAR missiles. Pomona. Bureau of Naval Weapons.

—**North American Aviation**, Anaheim, Calif. $1,104,000. Repairs to certain models of ship inertial navigation system gyroscopes. Anaheim. Bureau of Ships.

—**Raytheon Co.**, Oxnard, Calif. $2,650,000. Development models of fire control systems for the basic point defense surface missile system program. Oxnard. Navy Purchasing Office, Los Angeles.

16—**Collins Radio Co.**, Cedar Rapids, Iowa. $8,812,369. Components for the AN/ARC-51 radio used on A-4F and P-3A aircraft. Cedar Rapids. Navy Purchasing Office, Washington, D.C.

—**Bermite Powder Co.**, Saugus, Calif. $1,301,369. Fuzes for 20mm projectiles. Saugus. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**General Motors**, Indianapolis, Ind. $1,123,200. Conversion kits for T-56 aircraft engines. Indianapolis. Navy Aviation Supply Office, Philadelphia.

—**United Aircraft**, East Hartford, Conn. $3,595,085. J-75-P-13B engines for the Air Force. East Hartford. Bureau of Naval Weapons.

—**General Precision, Inc.**, Little Falls, N.J. $3,115,251. Production of navigation computer sets for Navy aircraft. Little Falls. Bureau of Naval Weapons.

17—**Sperry Rand Corp., Sperry Gyroscope Co.**, Great Neck, N.Y. $1,961,900. Instrumentation radar sets. Great Neck. Bureau of Naval Weapons.

—**North American Aviation**, Anaheim, Calif. $2,018,097. Fabrication and test of airborne ASW radar sets. Anaheim. Bureau of Naval Weapons.

—**United Aircraft**, East Hartford, Conn. $21,534,008. J52-P-8A engines. East Hartford. Bureau of Naval Weapons.

18—**Kentro Hawaii Ltd.**, Honolulu, Hawaii. $11,561,802. Operations and operational maintenance of telemetry installations in the Pacific area. Navy Purchasing Office, Los Angeles.

—**United Boatbuilders, Inc.**, Bellingham, Wash. $2,879,280. 144 landing craft vehicles, personnel (LCVP). Bellingham. Bureau of Ships.

21—**Sperry Gyroscope Co., Sperry-Rand Corp.**, Syosset, N.Y. $1,432,000. Repair components and subsystems of ship inertial navigation system models. Syosset. Bureau of Ships.

—**Royal Industries, Inc.**, Engineer Products Div., Alhambra, Calif. $1,952,979. Aircraft fuel tanks for use on A-4A and TA-4E aircraft. Alhambra. Navy Purchasing Office, Washington, D.C.

22—**Doyle and Russell, Inc.**, Norfolk, Va. $1,024,877. Construction of a briefing theater and communications centers at Atlantic Fleet Headquarters, Norfolk. Atlantic Div., Bureau of Yards & Docks.

—**ITT Federal Laboratories, Division of** International Telephone & Telegraph Corp., Nutley, N.J. $1,262,481. Receiver transmitters, mountings and control boxes. Camden, Ark. Navy Purchasing Office, Washington, D.C.

—**ITT Gilfillan, Inc.**, Los Angeles. $2,880,844. Engineering support for radar systems. Los Angeles. Bureau of Ships.

23—**General Electric**, Schenectady, N.Y. $1,180,000. Reactor plant components for naval nuclear powered ships. Schenectady. Bureau of Ships.

24—**Sperry Gyroscope Co., Sperry Rand Corp.**, Syosset, N.Y. $1,500,000. Development of inertial navigation subsystems for submarines. Syosset. Bureau of Ships.

—**IBM, Inc.**, Federal Systems Div., Rockville, Md. $1,310,282. Design and development of a data processing system for use in maintaining intelligence records. Rockville. Bureau of Naval Weapons.

—**University of Washington**, Applied Physics Laboratory, Seattle, Wash. $1,410,778. Research and development work in the field of underwater ordnance. Seattle. Bureau of Naval Weapons.

—**General Precision, Inc.**, Link Div., Binghampton, N.Y. $1,050,000. Conversion of units of F-4C and F-4C Weapon System Training Sets. Binghampton. Naval Training Device Center, Orlando, Fla.

—**Plymouth Industrial Products**, Sheboygan, Wis. $3,515,224. Stablizing coated rods for 2.75mm rockets. Sheboygan. Navy Ships Parts Control Center, Mechanicsburg, Pa.

—**Raber-Kief, Inc., and B-E-C-K Constructors**, Seattle, Wash. $1,463,260. Construction of an Air Terminal Building and an Administration Building at the Naval Station, Adak, Alaska. Northwest Div., Bureau of Yards & Docks.

25—**Curtiss-Wright Corp.**, Wright Aeronautical Div., Wood-Ridge, N.J. $1,103,300. Kits to support J65W16 engines for A-4-B and F-1-C aircraft. Wood-Ridge. Navy Aviation Supply Office, Philadelphia.

—**Varo, Inc.**, Garland, Tex. $1,905,005. Guided missile launchers with power supplies for use on F-4 aircraft. Garland. Navy Purchasing Office, Washington, D.C.

—**Arthur D. Little, Inc.**, Cambridge, Mass. $1,404,961. Technical consultation and engineering services in connection with sonar systems. Cambridge. Bureau of Ships.

—**Willamette Iron & Steel Corp.**, Richmond, Calif. $1,221,412. Overhaul of the oiler USS Mattaponi (AO-41). Richmond. Industrial Manager, 12th Naval Dist.

—**R. M. F., Inc.**, King of Prussia, Pa. $6,711,550. Nozzle and fin assemblies for 2.75mm rockets. Tampa, Fla. Navy Ships Parts Control Center, Mechanicsburg, Pa.

28—**Jess Howard Electric Co.**, Columbus, Ohio. $1,055,000. Paving and lighting of a runway shoulder at Bunker Hill AFB, Ind. Midwest Div., Bureau of Yards & Docks.

—**Raytheon Co.**, Lexington, Mass. $2,023,158. Engineering and design services in connection with the SPARROW weapon system. Lexington. Bureau of Naval Weapons.

29—**Garrett Corp., AiResearch Mfg. Co.**, Phoenix, Ariz. $2,241,000. T-76-G-6/-8 engines for Air Force and Navy aircraft. Phoenix. Bureau of Naval Weapons.

—**Raytheon Co.**, Lexington, Mass. $2,479,790. Guidance and control groups for Sidewinder missiles. Lowell, Mass. Bureau of Naval Weapons.

—**Alpine Geophysical Associates, Inc.**, Norwood, N.J. $4,637,111. Conduct of a Marine Geophysical Survey Program. Norwood and in the Northwest Pacific Ocean. Naval Oceanographic Office, Suitland, Md.

30—**Loral Corp.**, Bronx, N.Y. $1,000,000. Design, development and fabrication of test models of radio receiving equipment. Bronx. Bureau of Naval Weapons.

31—**Westinghouse Electric**, Pittsburgh, Pa. has received six Bureau of Ships contracts totaling $19,464,675 broken down as follows: $1,968,901 — designing and furnishing of reactor plant components for nuclear powered ships. $1,900,000 — designing and furnishing of reactor plant components for nuclear powered ships. $4,991,250 — reactor plant service equipment for nuclear powered ships. $1,638,400 — design and furnishing of reactor plant components. $4,032,124 — design and furnishing of reactor plant components. $4,934,000 — continuation of research and development work in the field of naval nuclear propulsion. Work will be done in Pittsburgh.

—**General Electric Co.**, Schenectady, N.Y. has received three contracts from the Bureau of Ships. $3,315,000 — Research and development work in the naval nuclear propulsion field. $4,605,400 — replacement of reactor plant components for naval nuclear powered ships. $1,865,600 — Design and furnishing of reactor plant servicing equipment for naval nuclear powered ships. Work will be done in Schenectady.

—**General Electric**, Washington, D.C. $2,498,000. Design and development of the POSEIDON missile fire control subsystem and guidance subsystem support equipment. Pittsfield, Mass. Special Projects Office.

—**United Aircraft**, East Hartford, Conn. $1,282,275. Blades for J-75 engines, $2,694,337. Blade sets for J-57 engines. East Hartford. Navy Aviation Supply Office, Philadelphia.

—**Atlas Tool & Die Corp.**, Paramount, Calif. $1,441,165. Steel pallets for arms storage. Paramount. Navy Ships Parts Control center, Mechanicsburg, Pa.

—**Northwest Marine Iron Works**, Portland, Ore. $1,216,908. Modification of the missile range instrumentation ship RICHFIELD (T-AGM-4). Portland. Industrial Manager, Eight Naval Dist.

—**Cosmodyne Corp.**, Torrance, Calif. $1,498,637. Twelve liquid oxygen/nitrogen generating plants. Torrance. U.S. Marine Corps.

AIR FORCE

1—**Hughes Aircraft**, Fullerton, Calif. $1,700,000. Technical studies on overland radar. Fullerton. Systems Engineering Group, Research & Technology Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Westinghouse Electric Corp.**, Dayton, Ohio. $1,069,828. Production of generators for T-38 and F-5 aircraft. Dayton. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

3—**General Electric**, Cincinnati, Ohio. $2,154,580. Provisioning order for production of spare parts for J-79 aircraft engines. Cincinnati. Oklahoma City Air Materiel Area (AFLC), Tinker AFB, Okla.

—**General Electric**, West Lynn, Mass. $4,000,000. Component improvement program for T-64 helicopter engines. West Lynn. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**North American Aviation**, Anaheim, Calif. $7,189,072. Components for the improved MINUTEMAN guidance system. Anaheim. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

—**North American Aviation**, Anaheim, Calif. $5,902,991. Production of depot maintenance equipment to support the MINUTEMAN missile program. Anaheim. Ballistic Systems Div. (AFSC), Norton AFB, Calif.

—**United Aircraft**, West Palm Beach, Fla. $2,090,000. Work on a development program for high performance rocket engines. West Palm Beach. Air Force Flight Test Center (AFSC), Edwards AFB, Calif.

—**General Motors**, Indianapolis, Ind. $19,440,000. Production of T-56 engines for C-130 aircraft. Indianapolis. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**York Corp.**, York, Pa. $2,269,924. Design, fabrication and installation of environmental control systems for aircraft engine test facilities. Arnold Engineering Development Center (AFSC), Arnold AFS, Tenn.

4—**General Motors**, Indianapolis, Ind. $1,600,000. Work on a Phase I development program for a Direct Lift Engine. Indianapolis. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Cutler-Hammer, Inc.**, Deer Park, N.Y. $3,121,004. Spare parts for airborne reconnaissance systems. Deer Park. Warner Robins Air Materiel Area (AFLC), Wright-Patterson AFB, Ohio.

—**Raytheon Co.**, Bedford, Mass. $1,800,000. Work on an advanced airborne overland radar system. Bedford. Systems Engineering Group, Research & Technology Div. (AFSC), Wright-Patterson AFB, Ohio.

7—**Lockheed Aircraft**, Sunnyvale. $2,010,233. AGENA rocket launch services for 1966. Cocoa Beach, Fla. Space Systems Div. (AFSC), Los Angeles.

—**AVCO Corp.**, Stratford, Conn. $3,483,131. Production of T-53 helicopter engines for the Navy and Air Force. Stratford. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

8—**Westinghouse Electric**, Baltimore, Md. $1,360,000. Work on overland radar. Baltimore. Systems Engineering Group, Research & Technology Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Cleveland Pneumatic Tool Co.**, Cleveland, Ohio. $1,600,625. Production of landing gear components for KC-135 aircraft. Cleveland. Oklahoma City Air Materiel Area (AFLC), Tinker AFB, Okla.

—**Continental Aviation & Engineering Corp.**, Detroit. $1,191,910. Component improvement program for J-69 engine for T-37 aircraft. Detroit. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Kollsman Instrument Corp.**, Elmhurst, N.Y. $2,331,218. Production of aerospace ground equipment for mapping and survey systems. Elmhurst. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

9—**General Electric**, Syracuse, N.Y. $3,000,000. Support services for the Air Force and NASA programs at the Eastern and Western Test Ranges. Syracuse, N.Y., Vandenberg AFB, Calif. and Patrick AFB, Fla. Space Systems Div. (AFSC), Los Angeles.

—**Goodyear Aerospace Corp.**, Litchfield Park, Ariz. $1,299,447. Repair services for Army, Air Force and Navy airborne radar. Litchfield Park. Warner Robins Air Materiel Area (AFLC), Robins AFB, Ga.

—**A. J. Industries**, El Monte, Calif. $8,003,436. Production of fuel tank assemblies for F–4C aircraft. El Monte. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

10—**Fairchild Camera/Instrument Corp.**, Syosset, N.Y. $1,000,000. Production of aircraft cameras. Syosset. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Boeing Co.**, Seattle, Wash. $2,120,000. T–50 engine improvement program. Seattle. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**General Electric**, Cincinnati, Ohio. $11,998,600. Work on a propulsion system for high performance strategic aircraft. Cincinnati. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**United Aircraft**, East Hartford, Conn. $11,998,000. Work on a propulsion system for high performance strategic aircraft. East Hartford. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Collins Radio Co.**, Cedar Rapids, Iowa. $1,150,122. Production of communications equipment for RF–4C aircraft. Cedar Rapids. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

11—**Kollsman Instrument Corp.**, Elmhurst, N.Y. $3,278,700. Production of aerospace ground equipment for mapping and survey systems. Elmhurst. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

United Aircraft, United Technology Center Sunnyvale, Calif. $11,015,049. Production of ordnance items. Redwood City, Calif. Ogden Air Materiel Area (AFLC), Hill AFB, Utah.

—**Boeing Co.**, Seattle, Wash. $2,800,000. Research, development, test and engineering for modernization of Wings I through V of the MINUTEMAN weapon system. Seattle. Ballistic Systems Div. (AFSC), Norton AFB, Calif.

14—**United Aircraft**, East Hartford, Conn. $1,064,315. Production of components for the J–57 aircraft. East Hartford. San Antonio Air Materiel Area (AFLC), Kelly AFB, Tex.

15—**General Motors**, AC Spark Plug Div., Milwaukee, Wis. $1,238,865. Research and development for the TITAN II inertial guidance system. Milwaukee. Ballistic Systems Div. (AFSC), Norton AFB, Calif.

—**Hughes Aircraft**, Fullerton, Calif. $1,050,000. Study and design specifications for Tactical Air Control Centers. Fullerton. Electronic Systems Div. (AFSC), L. G. Hanscom Field, Mass.

—**Electronic Communications, Inc.**, St. Petersburg, Fla. $1,666,830. Production of ground communications equipment. St. Petersburg. Oklahoma City Air Materiel Area (AFLC), Tinker AFB, Okla.

16—**Bendix Corp.**, Teterhoro, N.J. $3,404,125. Production of electronic equipment for C–141 aircraft. Teterhoro. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

17—**Hycom Mfg. Co.**, Monrovia, Calif. $3,498,023. Production of spare parts for aircraft camera systems. Monrovia. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

18—**Boeing Co.**, Wichita, Kan. $3,550,000. Modification of B–52 bomb bays. Wichita. Oklahoma City Air Materiel Area (AFLC), Tinker AFB, Okla.

—**Collins Radio Co.**, Cedar Rapids, Iowa. $1,355,606. Production of flight instruments for F–4, F–105 and F–106 aircraft. Cedar Rapids. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

21—**Douglas Aircraft**, Long Beach, Calif. $2,390,871. Production of bomb ejector racks for F–4 aircraft. Torrance, Calif. Warner-Rohins Air Materiel Area (AFLC), Robins AFB, Ga.

22—**Cutler Hammer, Inc.**, Airborne Instruments Laboratory, Deer Park, N.Y. $2,500,000. Work on a flight test program for overland radar systems. Deer Park. Systems Engineering Group (AFSC), Wright-Patterson AFB, Ohio.

—**Honeywell, Inc.**, Hopkins, Minn. $1,929,345. Bomb production. Hopkins. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

23—**Consolidated Diesel Electric Co.**, Stamford, Conn. $1,121,478. Production of ground generators and related equipment. Stockton, Calif. Sacramento Air Materiel Area (AFLC), McClellan AFB, Calif.

24—**General Dynamics**, San Diego, Calif. $1,436,698. Modification kits for F–102 aircraft external fuel tank assemblies. San Diego. Sacramento Air Materiel Area (AFLC), McClellan AFB, Calif.

—**Hazeltine Corp.**, Little Neck, N.Y. $1,250,000. Airborne radar systems. Little Neck. Systems Engineering Group (AFSC), Wright-Patterson AFB, Ohio.

—**Lear Siegler, Inc.**, Grand Rapids, Mich. $1,545,918. Procurement of aircraft gyroscopes and spare parts. Grand Rapids. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

25—**Magnavox Co.**, Fort Wayne, Ind. $3,118,480. Production of aircraft communication sets. Fort Wayne. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

28—**Hallicrafters Co.**, Chicago. $2,200,000. Production of components for electronic countermeasure systems. Chicago. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

30—**Bendix Corp.**, Teterboro, N.J. $3,949,041. Production of aircraft navigational computers. Teterboro. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

—**Lockheed Aircraft**, Marietta, Ga. $1,022,544. Production of C–140 aircraft and related equipment. Marietta. Aeronautical Systems Div. (AFSC), Wright-Patterson AFB, Ohio.

31—**TRW, Inc.**, Redondo Beach, Calif. $1,475,000. Work on a space program. Redondo Beach. Space Systems Div. (AFSC), Los Angeles.

—**Martin-Marietta**, Baltimore, Md. $1,495,000. Modification of B–57 aircraft. Middle River, Md. Warner-Rohin Air Materiel Area (AFLC), Rohins AFB, Ga.

Army Scientific Advisors

(Continued from Page 7)

General Manager, Institute of Electrical and Electronics Engineers, Inc.

Forward Area Air Defense Weapons.

Chairman: Dr. William C. Tinus, Vice President, Bell Telephone Laboratories.

Army Aircraft Research and Development.

Chairman: Mr. Charles H. Zimmerman, Chief Engineer, U.S. Army Materiel Command, (At time of study he was Director, Aeronautics Research, National Aeronautics and Space Administration).

Antitank Weapons.

Chairman: Mr. Richard S. Morse, Chairman, Cryonetics Corporation.

Scientific Personnel.

Chairman: Dr. John E. Vance, Professor of Chemistry, New York University.

Tactical Automatic Data Processing Systems.

Chairman: Dean William L. Everitt, College of Engineering, University of Illinois.

Target Acquisition.

Chairman: Dr. Finn J. Larsen, Deputy Director of Defense Research and Engineering (At time of study he was Vice President, Honeywell, Inc.).

Barrier Research.

Chairman: Major General Leslie E. Simon, U.S. Army (Retired).

Current ad hoc groups are conducting studies as follows:

Combat Vehicle Weapon System.

Chairman: Dr. William C. Tinus, Vice President, Bell Telephone Laboratories.

Tactical Air Defense.

Chairman: Professor Lawrence H. O'Neill, Associate Dean, School of Engineering and Applied Science, and Director, Electronics Research Laboratory, Columbia University.

Design Criteria, Future Armored Vehicles.

Chairman: Dr. Allen E. Puckett, Executive Vice President, Hughes Aircraft Co.

How well has the Army succeeded in utilizing its panel of scientific talent? This is answered in part by pointing to concrete accomplishments. Besides the three mentioned previously, there are other significant contributions for which ASAP ad hoc group studies are responsible. These include:

- The formation of The Army Research Council, which instituted major concept changes in the organization of Army Materiel Command laboratories.
- Continuation or termination of specific Army aircraft R&D projects.
- Procurement and test of automatic switching equipment for tactical communications.
- Enhancing effectiveness and prestige of scientific personnel in Army laboratories.
- Concepts for forward area air defense.

This is only a fractional list, and a partial testimony to the effectiveness of the Army Scientific Advisory Panel. The frequent requests for the counseling service of ASAP individuals further indicates the diversity of the panel's scope. These requests have included calls for assistance ranging from surveys by senior scientific personnel in stateside laboratories to ambush detection studies in Vietnam—from environmental medicine in the tropics to communications in outer space.

Without exception, ASAP personnel have enthusiastically accepted these challenges. Though these are some of the nation's busiest men, they have willingly rearranged full schedules on short notice; they have attended meetings faithfully; many have worked on their own time to follow through on solutions to specific R&D problems. In short, they have placed their country's business first and the Army is fortunate and grateful for their generous service.

OFFICE OF THE SECRETARY OF DEFENSE
WASHINGTON, D. C. 20301

OFFICIAL BUSINESS

POSTAGE AND FEES PAID

UNIVERSITY OF FLORIDA
3 1262 09683 2844

FLARE

Cost Information Reports Orientation Meetings Scheduled

The Department of Defense, in cooperation with the National Security Industrial Association, the Aerospace Industries Association and Electronic Industries Association, is sponsoring a series of orientation seminars on the Cost Information Reports (CIR).

Sessions will be open to Defense Department and industry executives and are designed to provide orientation as to which organizations will be responsible for completing CIR reporting requirements and using CIR data. Attendants will also be acquainted with the need for the CIR, the techniques of implementation and the expected use of CIR data.

A representative from the Office of the Secretary of Defense will be on hand at each presentation to answer questions. The sessions will be approximately three hours long. The first meeting was held in Washington, D.C., April 19.

Information can be obtained by contacting Jack E. Hobbs, Office of the Assistant Secretary of Defense (Comptroller), Room 3B857, The Pentagon, Washington, D.C., (Area Code 202) OXford 7–7514.

Requests for attendance should be sent no later than 10 days prior to the date of the orientation, and be accompanied by the name of the individual, company and address, and position or grade.

Exact addresses of the orientations will be given each registrant a week prior to the scheduled session. Attendance will be limited to 100 representatives (50 Government and 50 industry). Additional sessions will be scheduled in case of excessive requests for attendance.

Current schedule is as follows:

April 26	Dayton, Ohio	May 18	Washington, D.C.
May 2	Los Angeles, Calif.	May 19	Atlanta, Ga.
May 4	Seattle, Wash.	May 23	St. Louis, Mo.
May 9	St. Louis, Mo.	May 24	Dallas, Tex.
May 11	San Francisco, Calif.	June 1	St. Paul, Minn.
May 17	Boston, Mass.	June 2	Denver, Colo.

SAAMA Assigned C–5A Repair Mission

San Antonio Air Materiel Area (SAAMA), Kelly AFB, Tex., has been designated by the Air Force Logistics Command as the specialized repair activity (SRA) for the C–5A heavy transport aircraft.

As SRA for the newest Air Force weapon system, now entering the production stage, SAAMA will serve as the focal point for major overhaul work when the aircraft becomes operational in 1969. Colonel Harold Walker heads the new C–5A Section at SAAMA.

SAAMA was selected earlier as system support manager (SSM) for the giant carrier. The SSM is responsible for world-wide management of logistics support of the transport.

The latest assignment to SAAMA relates only to the airframe and airframe components. SRA for the aircraft's engines has not been named. Oklahoma City Air Materiel Area, Tinker AFB, Okla., is SSM for the engine.

The C–5A is being developed and will be produced by Lockheed-Georgia Co. at its Marietta, Ga., plant. Development and production of the engine will be performed by General Electric Co.